

# MARINE REVIEW.

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No. 10.

## Sales of Ore—Lake Freights.

The Carnegie-Oliver mining interest takes the lead this year in establishing a season rate on the transportation of ore. They have engaged vessels of the American Steel Barge Co., vessels in which Mr. Oliver is interested at Pittsburg, and a fleet of six large carriers controlled by one Cleveland owner, for a large block of ore in addition to that part of the output of their mines that is, according to contract, to be moved by the Rockefeller fleet. The rate is 65 cents and the contracts are practically for the full season, as they run to Nov. 1. Negotiations for more tonnage are pending, but on additional business conditions more favorable to the ore interests are sought by the Carnegie representatives. These are the facts, however unfavorable they may be regarded by the owners of vessels that are not of modern type. Cleveland vessel managers who are included in this transaction, but who have no connection with the Carnegie or Rockefeller interests, say that they did not establish the 65-cent rate. The rate was made when they were given a part of the ore. A Marquette rate of 60 cents for the season has also been established by the engagement of a fleet of Cleveland vessels that has been engaged regularly in that trade for several seasons past.

As far as can be learned these are the only lake freight contracts that have been closed as yet, but ore is selling quite freely, and it is more than probable additional business will be closed up within the coming week. The readiness with which furnace companies have entered into negotiations for supplies of ore for the coming year may well be regarded as an indication of the very heavy business that is expected in the iron trade. Preparations are being made on all hands for shipments of ore just as soon as weather will permit of vessels being moved. Engineers of several of the large fleets controlled by the ore companies have already been placed at work getting ships ready for the opening. Ore sales agents were ready a week ago to take up negotiations with the furnace men for the sale of old range Bessemer ores, but they held off until Tuesday last in expectation of an agreement being finally entered into between the two big interests on the Mesabi range—Consolidated Mines and Minnesota Iron Co. Several meetings of the Mesabi companies have since been held in Cleveland but thus far without success attending their efforts. Transactions already closed for Bessemer ores all tend to confirm the belief that the year will be the most active in the history of the Lake Superior mining industry. In a few cases large quantities of the most desirable Bessemer ores were sold in Cleveland on Tuesday before sales agents began soliciting business, and it is quite probable that there will be a scarcity of these special grades. Dispatches from New York report failure, for the present at least, in the proposed wire and wire rod consolidation, but new efforts along the same line are heard of in other branches of the iron industry. Two or three meetings of pig iron producers have been held in Cleveland within the past few days, and it is announced that there is some prospect of certain agreements being reached between the furnace interests of Pittsburg and the Ohio districts.

The talk of trouble among the soft coal miners is still delaying preparations for the lake trade. Hocking valley operators say they cannot afford to pay the scale price with the abolishment of the differential between Ohio and western Pennsylvania, and they are declaring now, more than ever, that they will not sign the Chicago agreement. On a few cargoes of coal for the head of Lake Superior that might be loaded at once, 25 cents is all that is offered. Vessel brokers say they are offered some coal for the head of Lake Superior to be shipped throughout the season at 25 cents, but they do not find vessel owners willing to accept such a contract. It is quite probable that the opening rates on soft coal for single trips will be 25 cents to Lake Superior and 30 cents to Lake Michigan ports.

## Talk of Higher Insurance Rates.

Shipping journals from London report great dissatisfaction among English insurance companies as a result of their experience of late with marine business in this country. A report of the annual meeting of the British & Foreign Marine Co., contained in a copy of Fairplay just at hand, indicates a disposition on the part of the management of that big organization to take the lead in trying to have American companies co-operate in an effort to advance premiums. The New York underwriter of this company, Mr. Wright, and the Boston underwriter, Mr. McCombe, were called into special conference with the Liverpool management on this subject immediately following the annual meeting, at which the directors seemed to give over all other matters to the question of adopting strong measures to overcome the "disastrous results of rate cutting." The English papers seem to place special stress on the disadvantages of rate cutting in this country in reporting these meetings. They intimate that the leaders in the British & Foreign company are most at fault and do not give them much credit for their present effort to bring about a change. Criticism of Mr. Wright, the New York underwriter of this company, is especially severe. All this would indicate a tendency toward higher insurance rates on the lakes for the coming season, but it is still probable that in view of the few total losses sustained last season, lake vessel owners will not hurry themselves in placing insurance until competition between the several local agencies will enable them to fully determine the question for themselves.

Officers of the Engineers' Club of Cleveland elected Tuesday are: President, Frank Chittenden Osborn; vice-president, Samuel T. Wellman; secretary, Wm. H. Searles; treasurer, Walter Miller; librarian, Wm. E. Reed; directors for one year, Jos. R. Oldham, Samuel T. Dodd; directors for two years, Ralph A. Harmon, Chas. W. Hopkinson.

## New Canada-Atlantic Line.

"We have no doubt regarding the responsibility of people who are back of the new Canadian Atlantic line," said Mr. L. C. Hanna, in discussing the charter of the Menominee steamers for lake service in connection with the new line. "The railway is owned by one man and he is quoted at \$10,000,000 by the bank of Montreal. The charter of the five steamers—Roman, Grecian, German, Briton and Saxon—is for two years. Three of them are now at the ship yard of the Globe Iron Works Co., where the work of fitting them with package freight machinery and six gangways each is already under way. The other two steamers are loaded with coal at Ashtabula, but this will not prevent alterations being made."

There has been considerable speculation regarding the consideration involved in the charter of these vessels. The price has not been given out, but it is probably a little less than \$20,000 a year for each vessel. An expense of nearly \$6,000 for each vessel will be involved in making alterations. The removal of these ships from the office of M. A. Hanna & Co. will necessitate the chartering of a large amount of other tonnage for the ore business of that firm. The Menominee steamers are duplicates, each of about 3,000 tons capacity. They were built on an issue of bonds in 1891 for Ferdinand Schlesinger, but with the collapse of Schlesinger's big mining undertakings they were thrown back on the hands of their builders. A Chicago correspondent, who is very enthusiastic over the prospects of success attending the Canada-Atlantic venture, says:

"Upon the opening of navigation these steamers will connect the principal western ports of Lakes Michigan and Superior—Chicago, Milwaukee and Duluth—with the seaboard by a new lake and rail line that promises to work a readjustment of traffic conditions between the west and New England points, and between the west and the leading Atlantic seaports. The steamship line is to be known as the Canada-Atlantic Transit Co. The boats will be among the first to go into commission in the spring, carrying both grain and package freight from Chicago, Milwaukee and Duluth to Parry Sound, on the eastern shore of Georgian bay, which is the western terminus of the Canada-Atlantic Railway. This railroad has direct connections with Montreal, Boston, Portland and New York, and with maritime Canadian provinces. For several months the work of establishing this route has been going on quietly. The charter of a fleet of steel boats, the leasing of extensive properties, the erection of elevators and warehouse and dock facilities at the various points on the route, and the selection of officials and agents for the line, have occupied the attention of Messrs. E. J. Chamberlin, general manager, and C. J. Smith, general freight agent, for several months past, and they have recently made their final trip of inspection, so that the line is now ready for business so far as it can be made ready before the opening of navigation.

"At Parry Sound an elevator with a capacity of 1,500,000 bushels has been erected and equipped with modern facilities and appliances for the rapid handling and safe storage of grain. The marine leg of this structure is patterned after that of the Export elevator at Buffalo, and has a capacity of 19,000 bushels of oats per hour. A second elevator of like capacity and construction is planned to be ready later in the season. Warehousing and docking facilities are ample, over 1,500 feet of dock front being now completed. Switching facilities are sufficient to accommodate and handle ten trains at a time. The least depth of the harbor at Parry Sound—Depot Harbor—is 22¼ feet, and in most places there is several times that depth. It is ample in every part to accommodate the largest vessels. Channel approaches to the harbor are somewhat narrow in a few places, but it is not expected that there will be any difficulty on this score, as large vessels have been trading to Parry Sound during several seasons past. At Coteau, 345 miles east of Parry Sound, the Canada-Atlantic Railway crosses the St. Lawrence river. Here there is an elevator of 500,000 bushels capacity equipped for the transfer of export grain into barges to be floated down to the harbor of Montreal and unloaded into vessels of the various ocean lines. The railway company has recently increased its rolling stock, both cars and locomotives, and a separate department has been organized for the movement of time and through freight with the greatest speed and least possible handling en route. On shipments from eastern points there will be no re-handling between the point of origin and Parry Sound, and as the sailing distance between Chicago and Parry Sound is less than that between Chicago and lower lake ports, it is claimed that as good time can be made over this line from New York, Boston, Portland, Montreal, and points generally in New England states, as is now being made by the all-rail lines.

"The dock and warehouse property of the new company at Milwaukee is among the best in the city, and at Chicago their docks will be as well located as those of any of the lake lines entering that port. The dock under construction at Chicago has a frontage of 425 feet and the surface space is 50,000 square feet. Agents have been appointed in the principal seaboard cities and commercial centers of the New England states, as well as in the leading western cities. Mr. James Ritchie, the general eastern agent, is located at Boston, Mr. H. S. Heydon is the New York agent, and Mr. G. J. Harris is general western agent, with headquarters at Chicago."

Geo. E. Hartnell, who died at his home in Cleveland a few days ago, was interested in vessel property with Harvey H. Brown of Cleveland and several well-known vessel owners of Detroit. Although he has been at the head of one of the leading savings banks of Cleveland for several years past, Mr. Hartnell was a civil engineer of special ability. For a number of years he superintended construction work on a large scale for the Standard Oil Co. He designed the two dry docks of the Ship Owners Dry Dock Co. at Cleveland and also the dock of the American Steel Barge Co. at West Superior.



### Lorain Plant of Cleveland Ship Building Co.

The Review of Feb. 10 contained a description of the large dry dock—560 feet long—that is an important feature in the new plant of the Cleveland Ship Building Co. at Lorain, O. In the same issue the power house of the Lorain works (there is one central station for ship yard and dry dock) was illustrated and described. In this issue a plan show-

extend into the yard at the rear of the shop, and the traveler is thus used for unloading plates and other material cars and transferring it to the tools for bending, punching, etc. At the other end of the shop, after the plates have passed through the various operations, in order, from the flanging rolls and punches to the planers, they are deposited on low cars, which need to be pushed but a few feet into the yard to come underneath the high electric cranes which command the building berths. There are

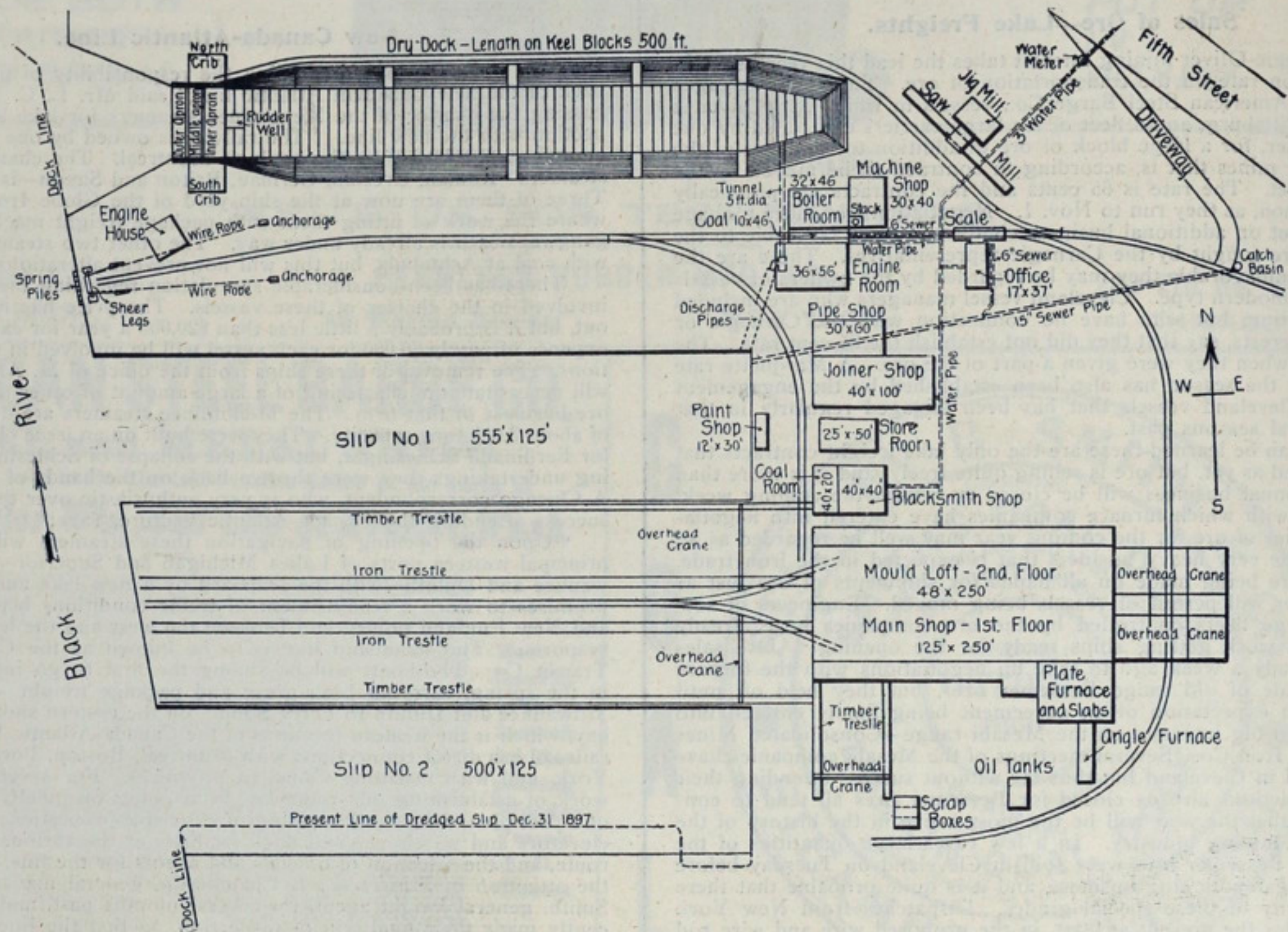


FIG. 1.—PLAN OF CLEVELAND SHIP BUILDING CO.'S PLANT AT LORAIN, O.

ing the dry dock, berths for new ships, various buildings and connections between cranes and railway spurs, is presented, together with views of the main shop.

This latter building, in which plates and shapes are prepared for new ships, is 125 by 250 feet, and is so constructed as to provide on an upper

two of these, of 10 tons capacity and 58 feet span, built by the Brown Hoisting & Conveying Machine Co.

The unusual extent to which pneumatic hoists and electric motors are used in these works is indicated by the illustrations. There are twenty-four Pedrick & Ayer (Philadelphia) air lifts, each mounted on a jib-

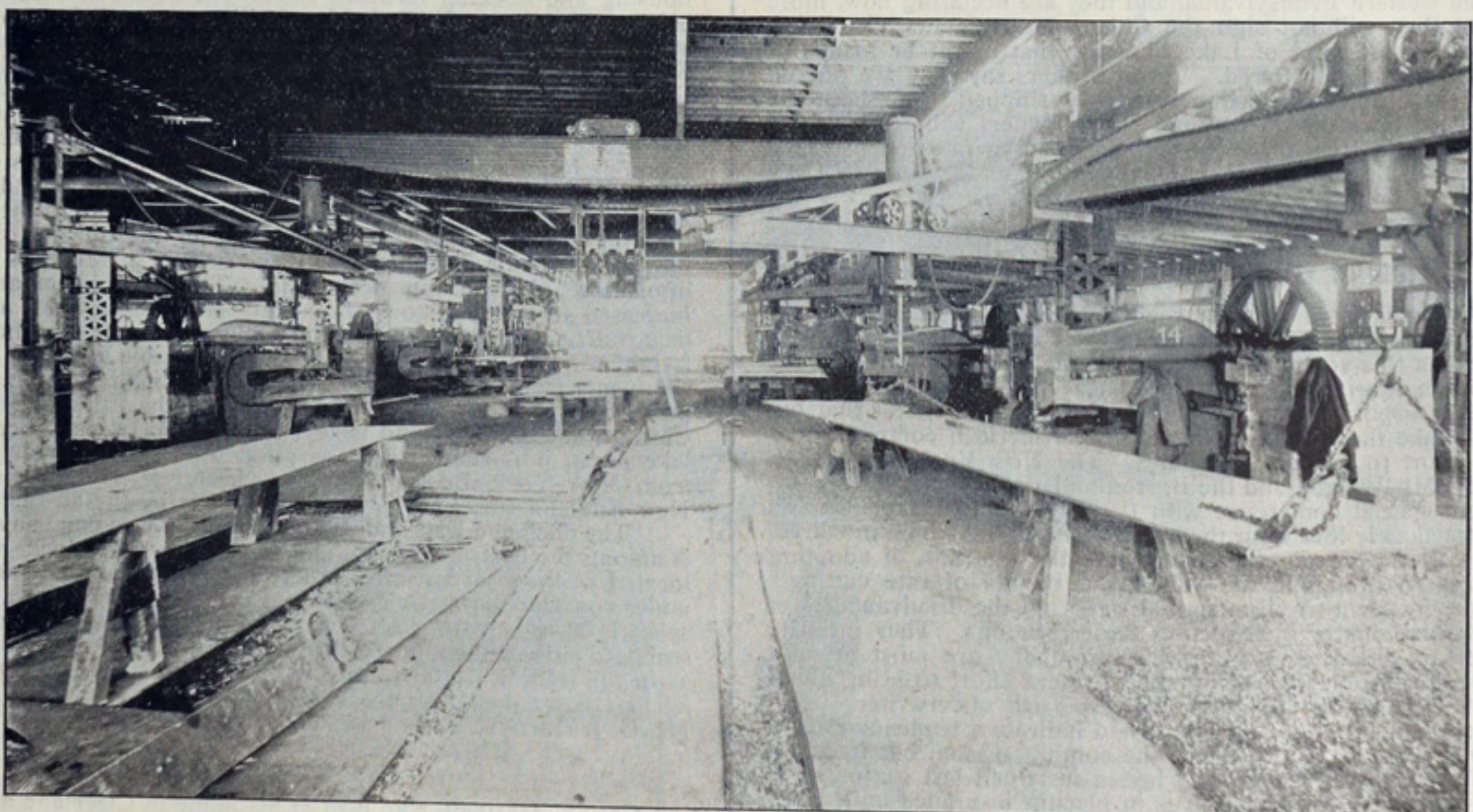


FIG. 2.—VIEW OF MAIN SHOP—CRANE SPAN, 40 FEET

floor a mold loft 250 feet long and 48 feet wide. There is ample light in the shop, as it is open at both ends, and windows in the wings and sides are large. The traveling crane equipment in this shop consists of two electric cranes, built by the Morgan Engineering Co. of Alliance, O., each of 7 tons lift and 40 feet span. Girders on which these cranes run

crane runway, the cranes being so disposed that all the tools are readily served with a minimum of hand labor. The compressor air supply, referred to in a previous issue when the power station was described, is furnished by a compressor of the Rand duplex type, having a capacity of 1,600 cubic feet. The steam cylinders are 14 inches by 22 inches, and



the air cylinders 22 inches by 14 inches, low pressure, and 14 inches by 22 inches high pressure. Besides operating the pneumatic hoists, compressed air is used for driving rivets on the frame work of vessels, also flush rivets on plates, reaming holes for rivets, chipping and caulking seams, operating pneumatic-hydraulic stationary riveters, drilling out countersunk rivet heads, and operating portable drills.

The electrical machinery, furnished by the Card Electric Co. of Alli-

can be taken out without disturbing the armature. The yoke of the generator is made of special cast iron with ample cross section, and the four poles are of cast steel. They are bolted to the yoke by means of two 1½-inch forged and turned tool steel bolts. The armature core and commutator are mounted on a cast iron spider, making these parts self-contained. The shaft can be removed without disturbing any parts of the armature or commutator. The armature core has a ¼-inch opening

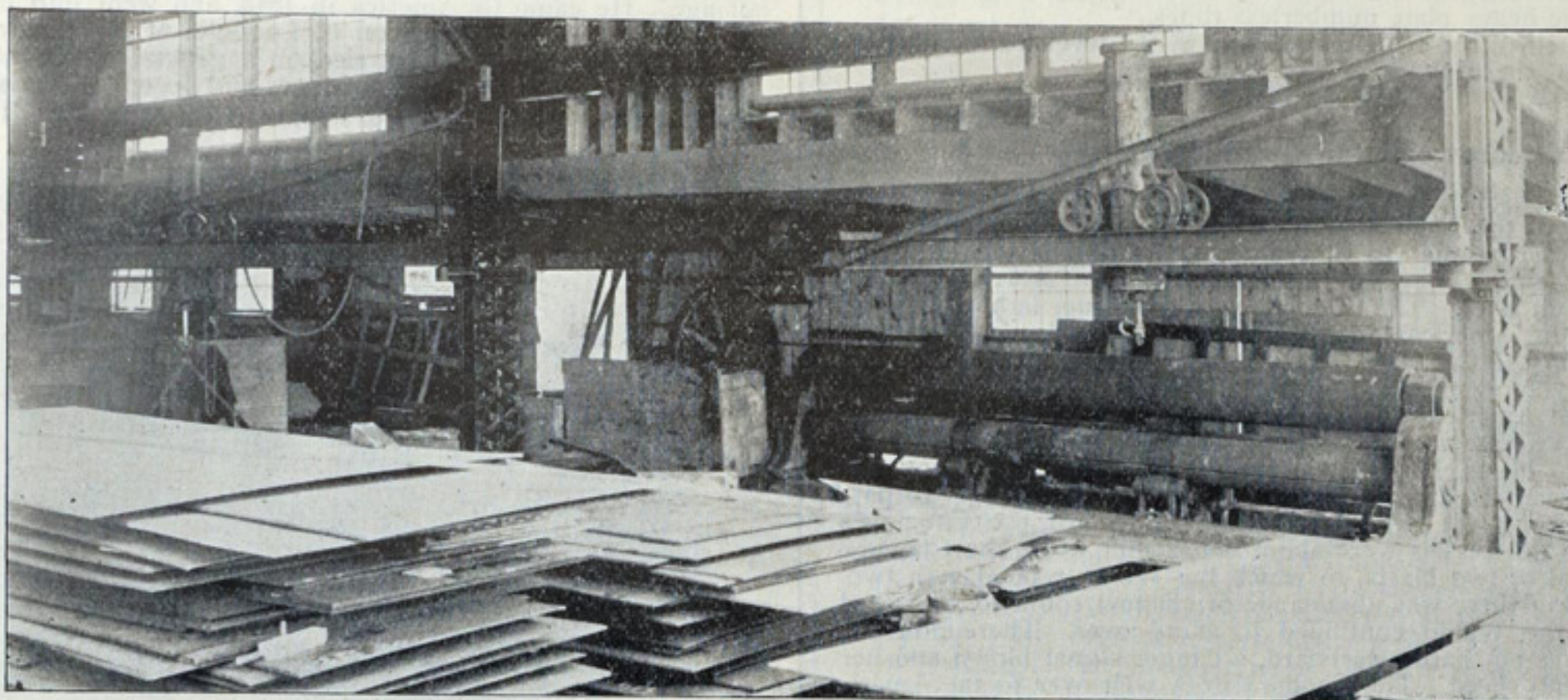


FIG. 3—VIEW AT END OF MAIN SHOP, SHOWING 18-FOOT BENDING ROLLS.

ance, O., is in detail as follows: One 100-k. w. 220-v. compound wound generator; one 30-h. p. mill-type motor for bending rolls; twenty-two enclosed type shunt-wound motors of varying capacities—five 2-h. p., eight 3-h. p., three 4-h. p., one 5-h. p., two 10-h. p., one 15-h. p., one 20-h. p., one 40-h. p., all 220-v. In all these motors the field coils, armatures and commutators are entirely protected from dust or careless handling. Each motor has an automatic safety and limit switch with resistance of the card make, and all are set for an overload of 25 per cent. They are entirely fireproof and well protected against dust or small par-

every 1½-inch of its length, allowing the air to pass through the armature core and around the windings. The compound coils and shunt coils are wound separately, admitting of the removal or renewal of one without disturbing the other.

In two or three cases tools in the main shop are grouped so as to be driven from one motor. A motor suspended from the ceiling drives shafting by which power is communicated to all the tools in the enclosed machine room shown in Fig. 4, as well as the two planers outside of this room, shown in the same view. The motor is of 10 h. p., and in addition

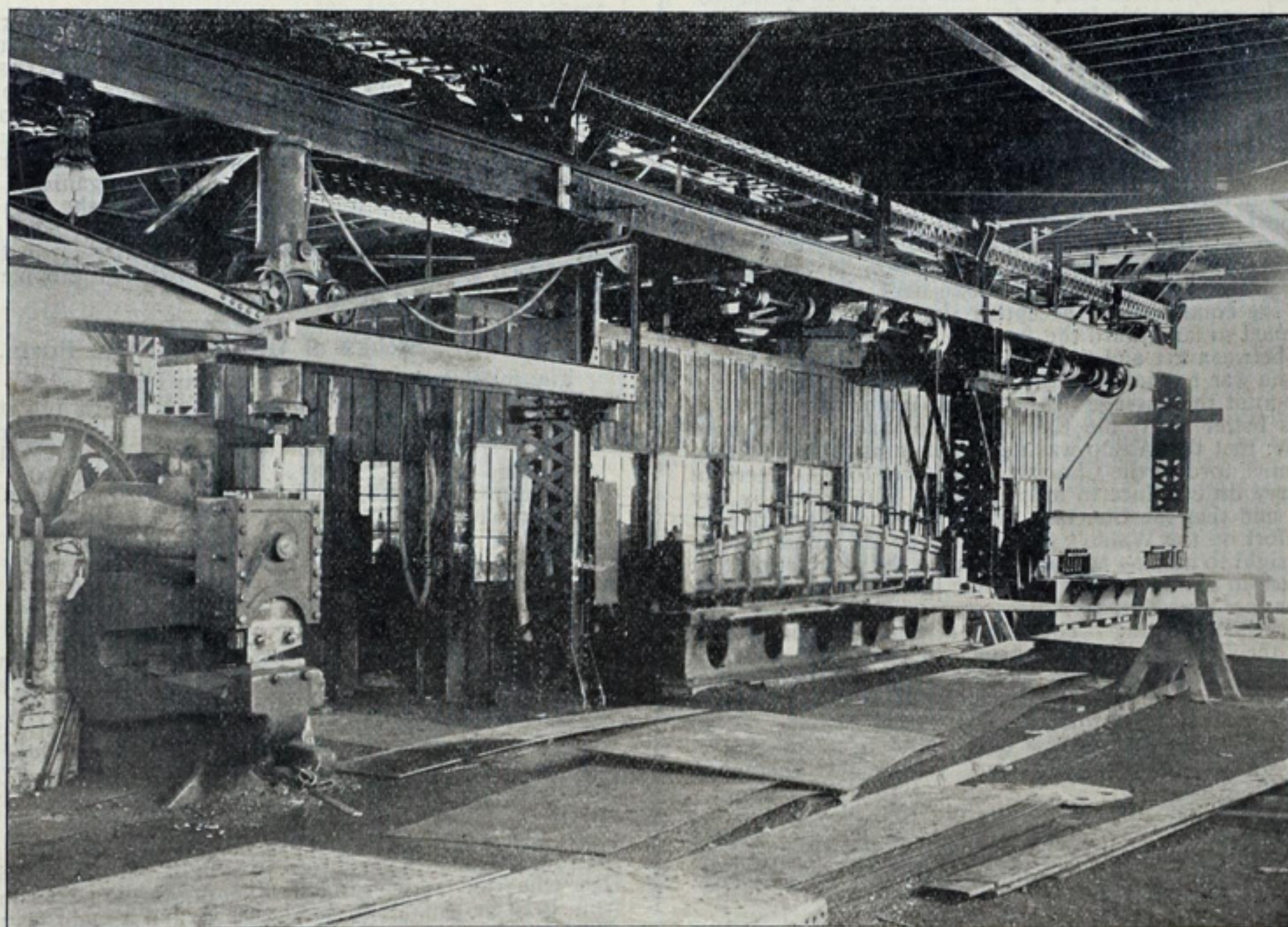


FIG. 4—ANOTHER VIEW OF MAIN SHOP, SHOWING PUNCH AND SHEARS.

ticles of iron. All have self-oiling bearings and are large and well adapted to the severe usage to which they are subjected in the class of work done at such plants. Some of the motors on the large punches and shears are working under an overload ranging from 35 per cent. to 50 per cent.; and the load goes from zero to a heavy overload in an instant and is off again in the same time. This tries the strength of the machines severely. The generator is of the latest pattern. It is so constructed that the armature can be completely uncovered by sliding the pole piece by means of a screw. This makes it easy of access for repairs. The field coil also

to the planers it furnishes power for a milling machine, lathe, two bolt cutters, a monkey drill, two emery wheels and a grindstone. For the most part the heavy tools of the shop are driven each by its own motor. There are fifteen punches, a channel punch and shear, a bevel shear, an angle iron shear, two sets of small rolls for straightening plates, three counter sinks, a cold press, heavy 18-foot flanging rolls, and a set of 16-foot bending rolls. The channel punching and shearing machine was built by the Long & Allstatter Co., of Hamilton, O., and was especially constructed for cutting a rectangular slot 4 inches wide to the full depth



of a 3½-inch flange of channel bars, and 6½ inches deep into the web. The slot would thus be 4 by 6½ inches in the web and 4 by 3½ inches deep in the flange. Tools are provided also for punching a large hole through the web very close to the flange. The machine was equipped with automatic stop for bringing the slide to rest on the completion of the stroke. The three countersinks referred to above are of an improved type. The machine is suspended from a jib-crane trolley and thus can be moved to any part of a plate—a great advance in convenience over the ordinary arrangement, which is a stationary machine, requiring the laborious moving of the heavy plate numberless times.

We are indebted to the Iron Trade Review of Cleveland for illustrations contained on these pages.

#### Choctaw-Waldo Collision Case.

United States District Judge Ricks of Cleveland rendered his decision in the case of the Lake Superior Iron Co., owner of the steamer Choctaw, against the steamer L. C. Waldo, on Wednesday, holding the Choctaw solely at fault. The collision happened on the morning of May 20, 1896, in the Sault river. The Choctaw was bound up, light, intending to pass through the American lock. The Waldo was loaded and proceeding down from the Canadian lock. It was claimed by the Choctaw that seeing the Waldo coming from the Canadian lock and designing herself to take the American lock, the Choctaw blew two blasts to the Waldo when the vessels were more than a mile apart; that the Waldo answered with two blasts, but that on coming to the turning buoy, the Waldo, instead of starboarding, as she should have done in order to pass down by the exchange of two blasts, held on toward the Choctaw's course; that when the vessels were about half a mile apart the Choctaw repeated her signal of two blasts, to which the Waldo replied with two, but, notwithstanding there was abundance of channel room to starboard of the Choctaw, the Waldo continued to stand over. Thereupon the Choctaw's helm was put hard astarboard, a danger signal blown and her engines reversed full speed. The Choctaw drew well over to the American side of the channel, and the Waldo, without apparently backing or making any effective effort to swing clear or to reduce her speed, came on and struck the Choctaw a little forward of amidships, cutting in to a depth of about 7 feet, pushing the Choctaw around. The Choctaw's engines were immediately started ahead and she was beached on the American bank, where she filled.

The owners of the Waldo answered that she had proceeded from the Canadian lock diagonally down, being under slow check and continuing at a low rate of speed; that as she came to the turning buoy, having it close aboard, she blew a passing signal of two blasts to the Choctaw; that the Choctaw was blowing at the same time, and thereupon the Waldo repeated her signal of two blasts, which was answered by a like signal from the Choctaw. The boats were, at this time, between a half and three-quarters of a mile apart. Reaching the point where she could turn, the helm of the Waldo was put hard astarboard and she turned as rapidly under such helm as it was possible for so large a vessel loaded to turn in that locality; that the Choctaw disregarded her agreement and continued coming up, heading on the port side of the Waldo until close to the latter, coming at apparently full speed, and when close to the Waldo began swinging under a starboard helm, projecting herself at great speed across the bows of the Waldo, whereupon the Waldo's engines were at once reversed, but before her headway could be stopped she collided with the Choctaw. The Waldo's engines were then worked full speed ahead, so as to keep her bow in the break in the Choctaw's side, and both vessels were worked full speed ahead toward the American shore.

A large amount of testimony was taken, on which the district court finds that the Waldo was solely at fault for the collision, in that, either having proposed that the vessels pass under two-blast signals by first blowing herself, as she contended, or accepting the two blasts from the Choctaw, she continued so far toward the American shore that the Choctaw could not pass between her and the shore; that if for any reason the Waldo found that she was not going to be able to make the turn in the ordinary way and permit the passage of the vessels under two-blast signals, she knew this better than the Choctaw could and should have warned the Choctaw; that the Waldo was negligent in assuming to take so much of the channel, forcing the Choctaw so far over to the American side that she had very little chance to maneuver or help herself by any use of her engines, and that the Choctaw, in the absence of any danger signals or of any effort on the Waldo's part to change the signals therefore given, had a right to assume and proceed upon the assumption that the Waldo would turn in such manner as to make it safe for the Choctaw to proceed in the manner agreed upon.

In conclusion the court said: "There are a large number of witnesses, residing at the 'Soo,' who have been examined, and some of whom have undertaken to tell how this accident happened. Effort has been made to impeach some of these witnesses, and a good part of the record is made up of testimony of that character; but there are certain facts which, in my judgment, control this case, and I have rather preferred to base my own judgment upon them." The court thereupon finds the Waldo solely at fault.

John C. Shaw and William B. Cady of Detroit, John Webster of the Sault, and George Clinton of Buffalo appeared for the Waldo, and Harvey D. Goulder of Cleveland for the Choctaw. The damage to the Choctaw was about \$25,000 and to the Waldo \$15,000. The trial of the case consumed three weeks.

Lieut. Commander W. H. Everett of the U. S. S. Michigan is enlisting seaman and machinists at Erie. Men competent in these two lines are wanted, but no others. To pass an examination for the rate of "machinist, second class," the candidate must know the machinist trade. He must also know the names and uses of the various parts of a marine engine and boiler, and must be able to do "bench work." He must be physically sound, not under twenty-one years nor over thirty-five years. Machinists who have had no experience at sea are rated "second class" and receive \$40 per month, with rations. Machinists who have been one year at sea are rated "first class," and receive \$55 per month. Seamen receive \$24 per month.

#### Henry F. Leopold.

Henry F. Leopold, whose death was announced in a note from Chicago, contained in the last issue of the Review, was among the pioneers of the Lake Superior country. He was known in the copper regions of the upper Michigan peninsula for many years before the firm of Leopold & Austrian, ship owners and commission merchants, took up headquarters in Chicago. Mr. Leopold was born at Riechen in the Grand Duchy of Baden, Germany, Nov. 23, 1825, and was therefore seventy-two years of age. He came to America in 1845, and went into business with his brothers, Louis F. and Aaron F. Leopold, at Mackinaw, Mich., and La Pointe, Wis., where they carried on a general merchandise and trading business. In 1853 the three brothers and Joseph Austrian started a general merchandise and mining supply store at Eagle River, Mich., near



HENRY F. LEOPOLD.

the famous Cliff copper mine. Afterward they also started a branch store at Eagle Harbor, Mich. This was in the days when railroads were unknown in that part of the country. In the early sixties the deceased and his associates were also interested in a trading and forwarding business at Hancock. They established headquarters in Chicago in 1865, and soon thereafter gave up the Lake Superior stores. The Lake Michigan and Lake Superior Transit Co., which comprises their vessel interests, was formed in 1877. When this company was organized, Mr. Leopold was made president, which position he occupied at the time of his death. He leaves a widow, two sons and four daughters. The sons, Nathan and Alfred Leopold, have important business interests in the Michigan copper district, and are very favorably known in the upper peninsula of that state, as well as in Chicago.

#### Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store in regular elevators at the principal points of accumulation on the lakes, March 5, 1898:

	Wheat, bushels.	Corn, bushels.
Chicago .....	8,450,000	16,626,000
Duluth .....	2,707,000	2,696,000
Milwaukee .....	108,000	123,000
Detroit .....	107,000	14,000
Toledo .....	225,000	504,000
Buffalo .....	800,000	1,094,000
	12,397,000	21,057,000

As compared with a week ago, the above figures show, at the several points named, a decrease of 390,000 bushels of wheat and an increase of 242,000 bushels of corn. On the same date there was afloat at Chicago 1,521,000 bushels of wheat, 6,840,000 bushels of corn, 232,000 bushels of oats, 198,000 bushels of rye and 93,000 bushels of barley; at Buffalo, 410,000 bushels of wheat and 84,000 bushels of rye; and at Milwaukee 1,207,000 bushels of corn and 316,000 bushels of oats.

It is more than probable that the Union Bridge Co., recently formed at Detroit, will make a very aggressive fight for the bridging of the Detroit river when the matter is again taken up in the next congress. The company is to be capitalized at \$2,000,000, and a main feature of its plans is an arrangement whereby all railroads, Canadian and American, applying for use of the bridge will be taken in as stockholders. Incorporators are the Grand Trunk and Wabash railways, Henry B. Joy, Allen Sheldon, Theodore D. Buhl, T. H. Newberry, Richard P. Joy, James Joy, E. W. Meddaugh, W. W. Crapo, C. M. Hayns, Joseph Ramsey, Jr., Walls N. Blodgett, O. D. Ashley.

It is again said that plans have been completed for the four new steamers which the Boston Fruit Co. is to build for service between Boston and Jamaica, and that work on them will begin at once at the works of the Cramps, Philadelphia. The vessels are to be 292 by 36 by 24 feet and are to be of 15 knots speed. They are to be built in accordance with a government mail contract.



**Appointments of Captains and Engineers.**

Ayer, Ed. E., Chicago: Steamer—Sachem, Capt. Thos. Ledden, Engineer John Maher.

Michigan Wrecking & Salvage Co., Detroit: Steamer—Ogemaw, Capt. Martin O'Toole, Engineer James H. Kendall.

Dunham, J. S., Chicago: Steamers—City of London, Capt. Wm. Anderson, Engineer J. J. Staley; W. P. Ketcham, Capt. W. J. Carter, Engineer Anthony J. Smith. Schooner—Geo. B. Owen, Capt. H. R. Moore.

Pennington, B. L., Cleveland: Steamers—C. B. Lockwood, Capt. R. Jollie, Engineer J. H. Haig; Geo. Spencer, Capt. F. W. Powell, Engineer Adam Haig. Schooner—B. L. Pennington, Capt. F. A. Pitcher.

Whitaker Bros., Detroit: Steamer—B. Whitaker, Capt. A. Ames, Engineer D. W. Blovet. Schooner, S. V. R. Watson, Capt. Chas. Woods.

West Division Steamship Co., Commodore Wolf, principal owner, Milwaukee: Steamers—Fred. Pabst, Capt. Daniel Sullivan, Engineer Charles H. Wilcox; W. H. Wolf, Capt. Wm. Lund, Engineer Thomas Albrighton.

Pauly, H. J., Milwaukee: Steamers—Thomas Davidson, Capt. —, Engineer W. H. Beals; Walter Vail, Capt. John McAvoy, Engineer Dennis McMillan. Schooner—Baltic, Capt. Thomas O'Donnell.

Conlon, J. & T., Thorold, Ont.: Steamer—Erin, Capt. P. Sullivan, Engineer J. Dawson. Schooners—F. L. Danforth, Capt. John Cornwall; Maggie, Capt. John Rosie.

McGraw Transportation Co., J. W. McGraw, principal owner, Bay City, Mich.: Steamers—City of Paris, Capt. E. D. Ballentine, Engineer Wm. McDougall; City of Venice, Capt. Chas. Ainsworth, Engineer J. A. McDougall.

Vulcan Transportation Co., James Findlater, Sec'y, Detroit: Steamers—Forest City, Capt. Joseph Sanders, Engineer Wm. Taylor; R. J. Hackett, Capt. Thos. H. Sanders, Engineer Wm. McKittrick. Schooners—H. H. Brown, Capt. Alexander Glen; Wm. McGregor, Capt. John Hochrath.

Lake Ontario & Bay of Quinte Steamboat Co., Kingston, Ont.: Steamers—North King, Capt. John Jarrell, Engineer O. J. Hickey; Hero, Capt. Wm. Bloomfield, Engineer John McEwan.

Spaulding Lumber Co., Chicago: Steamer—H. L. Worthington, Capt. James Travis, Engineer Fred. Otto. Schooners—J. B. Wilbor, Capt. John Bates; Wm. Jones, Capt. Oscar Clow; D. B. Martin, Capt. Oscar Clow; T. J. Bronson, Capt. John Bates.

Moore, J. W., Cleveland: Steamers—J. W. Moore, Capt. Richard Neville, Engineer Wm. Nicholas; Louisiana, Capt. Truman Moore, Engineer George Oldman; Colonial, Capt. R. J. Neville, Engineer George Maston; Marquette, Capt. Ed. Chilson, Engineer Ed. Burrows; Siberia, Capt. Clint. Ennis, Engineer Frank Bassett.

Hawgood, W. A., Cleveland: Steamers—L. R. Doty, Capt. Chris. Smith, Engineer Thos. Abernethy; Iosco, Capt. Jas. Owen, Engineer J. Chapman. Schooner—Olive Jeanette, Capt. D. B. Cadotte.

Lake Erie Transportation Co., A. W. Colton, Mgr., Toledo, O.: Steamers—Geo. J. Gould, Capt. W. M. Cottrell, Engineer Geo. Butler; S. C. Reynolds, Capt. Henry Root, Engineer James Miller; Russell Sage, Capt. T. C. Herrick, Engineer Joseph Kohlbrenner; Jno. C. Gault, Capt. C. H. Lewis, Engineer Jno. Busted.

Minch and Nicholas Transportation Companies, Wm. Gerlach, Mgr., Cleveland: Steamers—I. W. Nicholas, Capt. W. H. Johnson, Engineer W. H. Miller; Onoko, Capt. Joseph Lampoh, Engineer A. MacDonald; Philip Minch, Capt. N. B. Nelson, Engineer James H. Murray; Horace A. Tuttle, Capt. John Thompson, Engineer E. D. Butler; John N. Glidden, Capt. Wm. Carlross, Engineer E. A. Meeker. Schooners—Aberdeen, Capt. Anthony Lalonde; Dundee, Capt. D. C. Sullivan; Sophia Minch, Capt. D. L. Cartright; Warmington, Capt. P. J. LaVoo.

Ogdensburg Transit Co., Ogdensburg, N. Y.: Steamers—Walter L. Frost, Capt. J. W. Goodrich, Engineer James Chestnut; Wm. A. Haskell, Capt. E. B. Shay, Engineer Maurice Gore; Wm. J. Averell, Capt. W. D. Wait, Engineer J. Alexander; Gov. Smith, Capt. W. S. Shay, Engineer Jno. Phillips; J. R. Langdon, Capt. Harvey Brown, Engineer D. G. Costello; A. McVittie, Capt. W. H. Williams, Engineer A. D. Houghton; F. H. Prince, Capt. D. A. Kiah, Engineer R. Chestnut, Jr.; H. R. James, Capt. James Owens, Engineer James Turnbull.

Delta Lumber Co., E. L. Thompson, Mgr., Detroit: Steamers—Lewis Pahlow, Capt. H. McGowan, Engineer L. Jubenville; Ionia, Capt. B. F. Ogden, Engineer Thos. Purvis; City of Berlin, Capt. John Buie, Engineer Samuel Braund. Schooners—Delta, Capt. A. H. Shaffer; Wand, Capt. A. H. Shaffer.

Runnels, H. E., Port Huron, Mich.: Steamers—Maggie Duncan, Capt. D. M. Sinclair, Engineer Irving Buzard; O. O. Carpenter, Capt. John E. Rathbun, Engineer Joseph Watson. Schooners—Favorite, Capt. L. Sinclair; Constitution, Capt. Ed. Tousley; E. E. Tyson, Capt. C. W. Annis; W. W. Stewart, Capt. Walter Kemmis.

Western Transit Co., Buffalo: Steamers—Arabia, Capt. John Davis, Engineer Patrick Welch; Boston, Capt. Dugald Buie, Engineer Frank Miller; Buffalo, Capt. S. R. Jones, Engineer Wm. McNulty; Chicago, Capt. F. J. McCabe, Engineer Wm. Tibby; Commodore, Capt. Thos. Slattery, Engineer James Brooks; Harlem, Capt. Donald Gillies, Engineer Henry Hess; Hudson, Capt. A. J. McDonald, Engineer Moses Trouton; Mohawk, Capt. Robert Murray, Engineer M. J. Laney; Milwaukee, Capt. Michael Folan, Engineer John Rainey; Montana, Capt. F. D. Osborn, Engineer Jas. L. Walker; Syracuse, Capt. John Fisher, Engineer J. W. Mark; Vanderbilt, Capt. Neil McCormick, Engineer F. W. Hale.

Goodrich Transportation Co., Chicago: Steamers—Virginia, Capt. H. E. Stines, Engineer G. P. Roth; Indiana, Capt. A. Gallagher, Engineer Ray Flint; City of Racine, Capt. Jno. Wilson, Engineer Peter Weber; Atlanta, Capt. Wm. Nicholson, Engineer — Jerome; Iowa, Capt. John Raleigh, Engineer Jules Bushman; Georgia, Capt. E. Carns, Engineer Joseph Weber; Sheboygan, Capt. David Cochrane, Engineer F. Neidert; Chicago, Capt. Joseph Munger, Engineer W. H. Dent. Tug—Arctic, Capt. Thayer, Engineer F. Dorey.

Mitchell & Co., Cleveland: Steamers—Lagonda, Capt. C. B. Galton, Engineer W. F. Sauber; J. J. McWilliams, Capt. S. S. Stratton, Engineer Wm. Fetting; W. H. Gratwick No. 2, Capt. M. P. Parsons, Engineer

Henry Graves; John Mitchell, Capt. R. C. Jackson, Engineer John Riley; R. L. Fryer, Capt. B. D. Townsend, Engineer Gustav Gey; W. H. Gratwick No. 1, Capt. F. D. Galton, Engineer Frank Parker; W. F. Sauber, Capt. H. A. Stewart, Engineer Peter Lavelly; G. T. Hope, Capt. K. A. Jensen, Engineer Lewis Minnie; Ed. Smith No. 2, Capt. —, Engineer —; Ed. Smith No. 1, Capt. C. D. Miller, Engineer —. Schooners—J. C. Fitzpatrick, Capt. T. T. Tallaksen; S. E. Marvin, Capt. Wm. Brines; R. S. Fryer, Capt. Eli Jacques; C. J. Tillmore, Capt. —; Camden, Capt. Stephen Rose; Troy, Capt. H. C. Diem.

**Mr. Carnegie's Ship Yard Idea.**

In answer to a request from the Marine Review for an opinion regarding the recent letter of Andrew Carnegie to the Iron Trade Review of Cleveland, Mr. W. I. Babcock of the Chicago Ship Building Co. says:

"Mr. Andrew Carnegie's recent letter to the Iron Trade Review on ship building and the establishment of a great ship yard near New York is a very interesting paper, and it is causing widespread comment. His arguments are sound and incontrovertible. His statement that the total cost of labor would now be less in this country than abroad, even with our higher wages, provided a modern yard was built with the latest labor-saving appliances, is exactly what I said recently in the Marine Review, and I am pleased with such confirmation from so eminent an authority. That steel is now cheaper here than abroad, and will remain so, is well known. Doubtless also the vicinity of New York is the best location. Incidentally, the graceful compliment to our lake ship builders will be much appreciated around the lakes.

"The best yard in the world, however, would amount to little without ships to build, and contracts do not always go to the lowest bidder, even on government work. That foreign orders would come to this country on account of lower prices alone I do not believe; certainly not for a long time, and, with even more certainty, not to a new yard until its reputation was established by domestic work. Such a yard, therefore, must depend principally upon the domestic demand, and there is no domestic demand at present which the existing coast yards are not amply able to fill. When the agitation now going on for such national legislation as will enable us to regain our lost carrying trade bears fruit at Washington, there will be a gradually increasing demand for American ships, and then not one, but many, such yards as Mr. Carnegie describes will be the result.

"As, however, the proper establishment of such a yard and the creation of an efficient and harmonious force of workmen, foremen and heads of departments, is a work of several years, it is perhaps none too soon to make a beginning."

**Important Changes in the Light-house Service.**

Several naval officers in the light-house service who are well known on the lakes have recently been promoted and important changes are accordingly being made in the service. Winfield S. Schley, chairman of the light-house board, is now a commodore and is talked of as a possible successor to Rear Admiral Montgomery Sicard, commander-in-chief of the North Atlantic squadron. Theodore F. Jewell and Wm. M. Folger have been made captains. The latter officer was recently moved from Detroit to New York to take charge of the third light-house district, and will probably remain at that station. Capt. Jewell, who is about to turn over light-house affairs of the tenth district at Buffalo to Commander F. Hanford, will probably be given command of the Lancaster when she is commissioned as a gunnery ship. The naval secretary of the light-house board, Commander Geo. F. F. Wilde, has been ordered to take command of the ram Katahdin, which is to be placed in commission at League island navy yard today (Thursday). Another officer well known in light-house service, Commander B. P. Lamberton of the fifth district (Baltimore), has been ordered to the Boston, which at last accounts was in Chinese waters.

**Around the Lakes.**

A pneumatic device is being tried for painting vessels at the West Superior ship yard of the American Steel Co. A pail of paint is attached to an air tube and a spray forced against the surface that is to be painted.

Mr. A. J. Smith, chief engineer of the steamer Thomas Wilson, was married in Buffalo, Saturday. Mr. and Mrs. Smith have taken up a home in Marine City.

Assets of the Insurance Company of North America, represented on the lakes by Geo. L. McCurdy, Chicago, have reached \$10,023,220. The capital is \$3,000,000.

It would seem to be cheaper to buy new life-rafts than to tinker up the old ones, judging from a circular price-list sent out by the Detroit Sheet Metal & Brass Works. The circular gives also the capacity required for different numbers of persons.

New grain elevators building at West Superior will give that port a total storage capacity of about 16,000,000 bushels. It is expected that the new elevator of the Montreal Transportation Co.—about 800,000 bushels capacity—will be ready for service on the opening of navigation.

In order to hurry repair work at West Superior the barge company has been cutting ice, to replace the steel barge Constitution in dock by the steamer Victory. Extensive bottom repairs will be made on the Victory. The stringer plate on the steamer Northern Queen is being widened and a steel deck put in.

Capt. Albert Gibbs and Carl C. Joys of Milwaukee have formed a partnership—Gibbs & Joys—for the purpose of conducting a vessel agency and doing also a marine and fire insurance business. Capt Gibbs is well known as a vessel master and surveyor in the settlement of hull and cargo losses. Mr. Joys was in the employ of David Vance & Co. for eleven years.

Barry Bros. of Chicago have posted circulars in the offices of vessel owners announcing that they are about to open at their Chicago office a book of reference for everybody in any way connected with the marine business. In the book will be registered the names, residence and occupation of marine men, names of boats they are connected with, position held, and the grade of masters and engineers. For all that register in the book the company will undertake to forward all mail or messages that come to its care.





DEVOTED TO LAKE MARINE AND KINDRED INTERESTS.

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The books of the United States treasury department on June 30, 1896, contained the names of 3,333 vessels, of 1,324,067.58 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1896, was 383 and their aggregate gross tonnage 711,034.28; the number of vessels of this class owned in all other parts of the country on the same date was 315 and their tonnage 685,204.55, so that more than half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1896, was as follows:

	Number.	Gross Tonnage.
Steam vessels.....	1,792	924,630.51
Sailing vessels and barges.....	1,125	354,327.60
Canal boats.....	416	45,109.47
Total.....	3,333	1,324,067.58

The gross registered tonnage of the vessels built on the lakes during the past six years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30.	1891	1892	1893	1894	1895	1896	Total
Number of vessels.....	204	169	175	106	93	117	864
Gross tonnage.....	111,856.45	45,968.98	99,271.24	41,984.61	36,352.70	108,782.38	444,216.36

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC. (From Official Reports of Canal Officers.)

	St. Mary's Falls Canals.			Suez Canal.		
	1896*	1895*	1894	1896	1895	1894
Number of vessel passages.....	18,615	17,956	14,491	3,409	3,434	3,352
Tonnage, net registered.....	17,249,418	16,806,781	13,110,366	8,560,284	8,448,383	8,039,175
Days of navigation.....	232	231	234	365	365	365

\*1895 and 1896 figures include traffic of Canadian canal at Sault Ste. Marie.

The big suction dredges that are constantly at work clearing Liverpool harbor are wonderful machines. Prior to 1890, when the rivalry of Southampton was first recognized as serious, the great sandbar at the mouth of the Mersey had only 11 feet of water upon it at the ebb of spring tides. After dredging at this bar in the ordinary way from 1890 to 1893, the Mersey dock board in the latter year put the great centrifugal suction dredge boat Brancker to work. This boat is 320 feet long by 46 feet 10 inches beam, has twin screws and can steam at the rate of 10 knots an hour. Her hoppers hold 3,000 tons of sand, which, therefore, constitute the full load which she carries out to dump in deep water. Her suction powers are so enormous that under favorable circumstances she can put the 3,000 tons of sand in her hoppers in 25 minutes, never taking longer than 45 minutes. She has a record of 39,000 tons of sand sucked and dumped in the twenty-four hours and of 183,000 tons in five and a half successive days. The result is that at ebb spring tides there is now a depth of 25 feet of water on the Mersey bar instead of 11 feet, as formerly. In all, 17,000,000 tons of sand were removed from the Mersey bar since 1890, the Brancker being assisted, since 1895, by a duplicate sister suction boat, the G. B. Crow.

The action of the treasury department in deciding to discontinue the practice of keeping fractional records of the tonnage of vessels (hundredths of a ton) will tend to simplify the records of the department and will also satisfy vessel owners, who could never see the reason for splitting hairs so fine as to carry in all of the official documents such a small matter as a few hundredth parts of a ton in a vessel of six or seven thousand tons. The order goes into effect July 1, 1898. It was issued in consequence of the receipt of a complaint from the Detroit Dry Dock Co. with reference to the measurement of two vessels belonging to the company of exactly similar build, but between which the official measurer made a difference of four or five tons. The company also complained of the necessity of having to stamp fractions of a ton on the beams of ships.

The heavy losses sustained some time ago by the steamers Montegale and Rosedale at East Charity shoal, Lake Ontario, cannot be attributed in any way to fault of light-house officials, but it is probable, nevertheless, that the officer in charge of the tenth district will give special attention to the marking of shoal water in this vicinity during the coming season. Capt. Geo. McLeod of Buffalo, who represented the underwriters in wrecking operations on these vessels, says they were both on East Charity shoal, as shown by the corrected chart of 1895. The gas buoy bore from the Rosedale N. W.  $\frac{1}{2}$  W., about  $\frac{1}{2}$  mile distant. There are sharp rocks in great numbers on the shoal, which covers four or five acres. Capt. McLeod says that the shoalest water he found was 10 feet, but he is of the opinion that there is less water on top of the rocks in some places.

In the United States district court at Milwaukee, a few days ago, Judge Seaman rendered a decision in a personal damage case, that of Patrick Shea, seaman, against the steamer Osceola, in which, the dispatches say, "a precedent was established, as the court declared that the captain of a vessel is not a co-employee with a seaman." There is nothing new in this. The captain is not a fellow servant when acting in his official capacity; neither is the first mate, nor the second mate when acting for the captain. If any of these officers should, however, be engaged in

actually helping a seaman in the performance of labor of any kind, they would then be regarded in law as fellow servants.

Manufacturers of boat oars formed an association for the regulation of prices at a meeting held in Toledo, Wednesday. Firms interested are: Moorman Bros., Baton Rouge, La., and Carey, O.; Stryker Manufacturing Co., Stryker, O.; West Unity Manufacturing Co., West Unity, O.; National Boat Oar Co., Chattanooga, Tenn.; T. P. Wells Co., Duvall's Bluff, Ark., and A. H. Wells Co. of Clarendon, Ark. Officers of the association are: J. R. Moorman, Toledo, president; Wm. Fitzgibbons, Sarnac, Mich., vice-president; George H. Ford, Burton, O., secretary and treasurer.

Lake vessel owners were surprised by the announcement from Washington that the secretary of the treasury had been informed through the British ambassador that the Canadian government would hereafter allow American vessels to carry merchandise from one port in Canada to another. The story was soon denied in an official dispatch from Ottawa. The denial was expected, as the benefit to be derived by Canada through such a concession was not apparent. Certainly the United States would not return the compliment by offering to give the same privilege to Canadian vessels.

Both of the United States locks at Sault Ste. Marie will probably be operated during the coming season. Col. Lydecker has not ordered the lock force to work as yet, as he is of the opinion that in past years they were started to work earlier than was necessary. There has been some complaint among the men on account of being deprived of wages involved in two or three weeks of early preparatory work, but Col. Lydecker says that expense incurred in this way was unnecessary, and that the canal will be in readiness for the first vessels seeking passage.

It was the purchase of the Detroit river-front property known as the Clark dry dock tract that the Review referred to some time ago when it was said that the Detroit Dry Dock Co. contemplated some important improvements. The Detroit company proposes to keep up with the progress that is being made in the building of big ships and will build a dock suited to repairs on vessels of the largest class. A shallow dock will probably serve as well as a deep one, as steel vessels are not docked while loaded.

On her first trip out of New York, March 1, the new White Star line freighter Cymric took among principal cargo items 700 head of cattle, 1,002 sheep, 199 horses, 42,856 bushels of corn, 59,883 bushels of wheat, 13,413 bales of cotton, 8,093 pigs of lead, 3,231 sheets of steel, 1,061 barrels of oil, 1,313 barrels of wax, 710 barrels of glucose, 500 barrels of syrup, 1,580 barrels of grease, not to mention a large quantity of other miscellaneous freight. The Cymric has accommodations for about 100 passengers.

In the trial of the Susquehanna-Owen collision case at Buffalo last week before Attorney Geo. Clinton as referee, the proceedings took on all the dignity of a court. Mr. Clinton was addressed as "Your Honor" and was otherwise accorded great respect by the attorneys, who realized that his decision will, according to agreement, be entered up in the United States court at Cleveland as final.

The United States senate has passed a resolution providing for the printing for the use of the senate of 15,000 copies, in paper covers, of a pamphlet containing the views of Commodore George W. Melville, chief engineer of the navy, as to the strategic and commercial value of the Nicaraguan canal, the future control of the Pacific ocean, the strategic value of Hawaii, and its annexation to the United States.

Another cargo record has been broken. The Wilson line steamer Andrew Carnegie has taken aboard at Manitowoc 333,100 bushels of oats. The largest cargo of oats previously loaded on the lakes was that of the Bessemer company's steamer Geo. Stephenson, 323,250 bushels, equal to 6,137 net tons, taken from South Chicago to Buffalo.

Ground has been broken at Newport News, Va., for the big dock that is to be built by the Newport News Ship Building & Dry Dock Co. It will be 800 feet long and 100 feet in width and will be capable in every way of accommodating the largest ships that float.

Directors of the Delaware River Iron Ship Building & Engine Works (Roach ship yard at Chester, Pa.), elected a few days ago, are: John B. Roach, William F. McPherson, George E. Weed, George B. Lindsay and William C. Sproul.

John A. Cotter of Galveston, Texas, has been appointed supervising inspector of steam vessels for the tenth district, vice Matt O'Brien, deceased. Mr. Cotter was at one time inspector of hulls at Galveston.

### Mr. Haug's Patent Claims.

Editor Marine Review:—Mr. R. L. Newman's paper on construction of lake steamers, published in your last issue, is certainly a very able and interesting contribution regarding a subject that should receive more attention than it has yet received, but in my article, published by you April 1, 1897, I wrote of the same subject, and the improvements which I then suggested have been patented by me, as shown by enclosed copy of patent No. 586,436, dated July 13, 1897. As the subjects of this patent are the outcome of studies on which I have been engaged since 1892, I think I have a moral as well as a legal right to claim them as my property, and I will enforce these claims if necessary. JOHN HAUG.

Philadelphia, March 5, 1898.

[The specifications forming part of letters patent No. 586,436, to which Mr. Haug refers in the foregoing communication, have been published by the United States patent office. They deal with improvements in ship construction claimed by Mr. Haug, and which were illustrated and described in the Review of April 1, 1897.—Editor].



**Diamond Shoal Light-Ship.**

For three months past a light-ship has been stationed on Diamond shoal, off Cape Hatteras, the point of greatest danger to ships on the Atlantic coast, where two or three attempts to locate a permanent structure for lighting purposes have failed. This light-ship, anchored in a 30-fathom spot, has thus far ridden through the gales that prevail in this perilous part of the Atlantic in entire safety, and light-house officials are

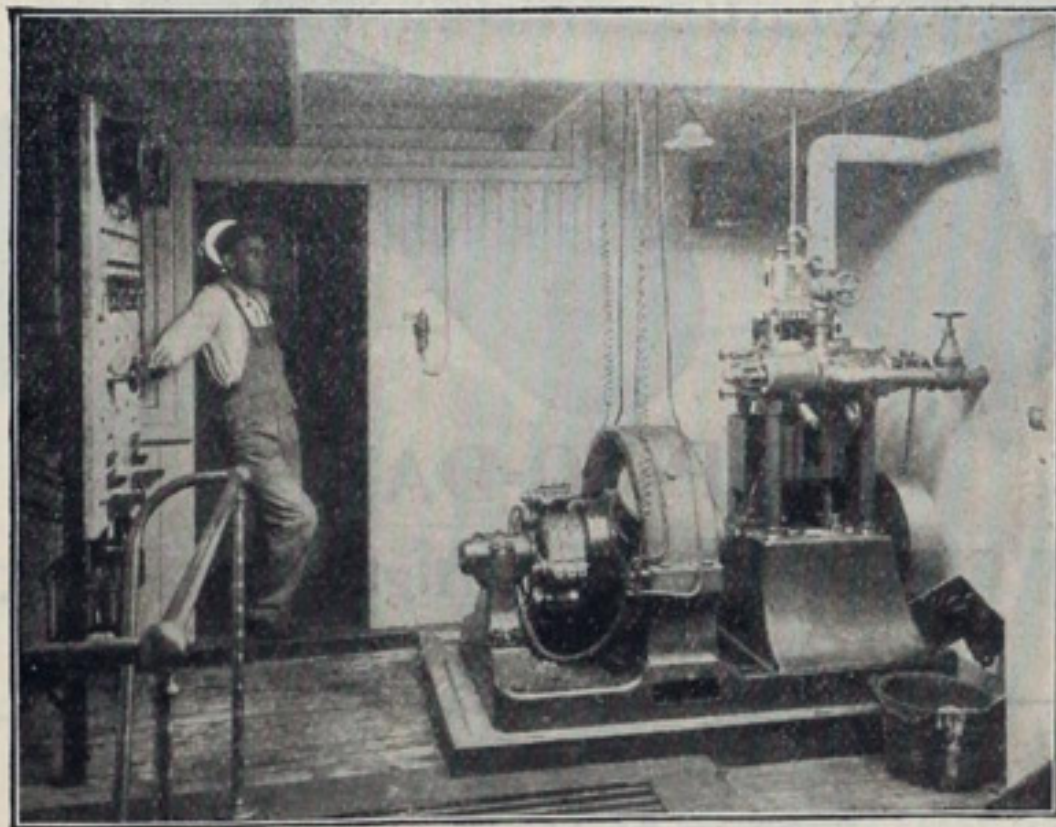


DIAMOND SHOAL LIGHT-SHIP.

about satisfied that a light-vessel can be maintained there in safety. Ship masters have now become familiar with the light, and until the vessel is replaced by a light-house, as originally intended, she will be a beacon to be carefully watched for and avoided.

In the light-house service this ship is known as No. 69. Nos. 68 and 69 are sister steamships, built at the yards of the Bath Iron Works, Bath, Me. No. 68 is the light-ship off Fire island, New York harbor. Both are unusually powerful composite vessels, 122 feet 10 inches long over all, 29 feet 6 inches extreme beam, and 22 feet molded depth. They are provided with propelling machinery to enable them to steam to their stations, and in case of necessity to steam away from their dangerous positions. The engines are simple condensing vertical, with a cylinder 20 inches in diameter and 22 inches stroke, developing 350 horse power at 150 revolutions. Steam is furnished at 100 pounds pressure by a Scotch boiler 12 feet 2 inches in diameter and 11 feet long. Two vertical donkey boilers furnish steam for the electric lighting plant, windlass, pumps and fog signals, and for heating. The vessels are also fitted with steam steering gear, bells, a steam winch and full equipment of anchors and chain cables. The two masts are of steel, and each, exclusive of the flag pole, is 64½ feet high. The electric lights are suspended at the mast heads, and are surrounded by a gallery for day signals.

To avoid chance of breakdown the electric plant on each vessel is in duplicate. Each plant consists of two marine generating sets, with



DYNAMO ROOM—DIAMOND SHOAL LIGHT-SHIP.

dynamo and engine, both built by the General Electric Co. of Schenectady, N. Y. The four-pole dynamos are 8-kilowatt, 650-revolution machines, directly connected to 4½-inch by 4-inch double cylinder engines. The switchboards are of Vermont marble and the wiring appliances used throughout are of the type approved by the United States naval board of inspection. The dynamos furnish 100-volt current to eight 100-candle power lamps—four at each masthead. There are also forty 16-candle power lamps. The masthead lights are each enclosed in a lens lantern, three being used and the fourth held in reserve. Connected in circuit to the masthead lights is a device making and breaking the circuit and lighting and extinguishing the lamps at regular intervals. A fixed white

light shows for 12 seconds and is followed by an eclipse of 3 seconds. The focal plane of the lights is 57 feet above the sea, and they are visible at a distance of 13 nautical miles in clear weather. Great reliance is placed upon the electric plants, and in their construction more than ordinary care has been taken, on account of the possible consequences of a breakdown through accident. The Review is indebted to the courtesy of the New York Tribune for the photographs from which the illustrations were made. The fog signals on these vessels are regulated by the automatic apparatus manufactured by the Signal & Control Co. of Brooklyn, of which Geo. J. Schoeffel is manager.

**A Successful Tug Builder.**

At least a dozen wooden tugs owned by Chicago firms have been built by E. W. Heath of Benton Harbor, Mich. During each winter for several years past a tug or two has been turned out at Benton Harbor for service on Lake Michigan, and the quality of these vessels has been steadily improving. A large tug now nearing completion is for Lydon & Drews, dredging contractors of Chicago. Of late Mr. Heath, who is a young man and who is now thoroughly versed in everything pertaining to the construction of tugs, has been considering the advisability of putting in tools for the building of steel tugs. The tendency is to gradually replace the lake fleet of wooden harbor tugs with steel vessels, although the wooden craft will be preferable in certain lines of service for some time to come. Mr. Heath realizes this tendency, and if he concludes to enter upon the building of steel hulls it may be expected that the product of the Benton Harbor yard will be of the best type. Tugs built at Benton Harbor are to be found at Duluth, Chicago, South Haven, Muskegon, St. Joseph, Marinette, Petoskey, Racine and other lake ports. The Chicago list of purchasers of these tugs includes the leading towing and dredging concerns of that place, among them the Vessel Owners' Towing Co., Fitzsimmons & Connell Dredging Co., Ashland Brown Stone Co., Independent Tug Line, Graham & Morton Transportation Co., Lydon & Drews Co., Green Dredging Co., Capt. R. A. Davis and M. J. Steffens.

E. W. HEATH,  
Benton Harbor, Mich.**Dr. Gatling's New Gun.**

Dr. R. J. Gatling, well known in army and navy circles, is still in Cleveland looking after finishing work on the 8-inch high-power gun, recently cast by the Otis Steel Co. He will soon take the gun to the Washington navy yard, to have it rifled and the breach mechanism made to it, after which it is to be taken to the Sandy Hook proving grounds for trial. This gun is of the best quality of alloyed steel and is designed to take the place of built-up guns, which are made of many pieces and are very expensive. "The British government has recently abandoned the built-up guns," says Dr. Gatling, "and is now experimenting with a new type of wire-wound guns, which are very expensive in construction. If my gun should prove a success, as I have every reason to believe it will, it will revolutionize heavy gun construction. I can make on my plan two guns for the same amount required to build one of the built-up guns."

Congress has appropriated \$40,000 to pay for this sample gun. It will be when finished 23 feet long. In the cast its weight was something over 60,000 pounds. The completed gun will have a diameter of 31 inches at the breech and 14 inches at the muzzle. The tensile strength of the steel composing the gun is expected to be about 100,000 pounds to the square inch. The powder strain to be withstood is reckoned at 38,000 pounds. Mr. William Metcalf, who was a pupil of Rodman, and who made Rodman guns during the war, has stated in a paper read before the Society of Civil Engineers in New York city, that if Rodman could have had steel of the same quality and in the masses attainable at the present time, no built-up guns would have been made or considered. An account comes from abroad that at the Swedish exposition held in Stockholm during the summer of 1897 there was a most interesting exhibit of steels, and that the claim was made by the Swedish engineers that with proper treatment cast steel is better than forged steel.

**Inland Lloyd's Register.**

"I know," says one of the general agents who is interested in the publication of the Inland Lloyd's Register, "that Capt. A. B. Drake and the men associated with him in compiling the register have been very particular in getting, or trying to get, the true condition of every vessel, designing to treat them in an absolutely impartial manner, without fear or favor. In every case where defects in vessels have been reported, the owners or managers have been informed of such defects. This may have led owners to believe their vessels were to receive severe treatment. That is not the design. There has been no general inspection for the Lloyd's since the spring of 1895, and since then it has been such uphill work for all vessels that there have been no repairs made which could be avoided, and very naturally the inspectors find many vessels that must be repaired to retain the class held heretofore. With one or two exceptions the owners have thanked the register officials for informing them of defects and needed repairs, taking the information in the same spirit in which it was given."

The steam specialties invented by William Craig are coming into quite general use for marine purposes. His automatic stop valves and exhaust relief valves are in use on all the principal ferry steamers in New York harbor, as is also his jet condensing apparatus. His latest device is a heating and circulating apparatus for marine boilers. Engineers should have on file a catalogue containing descriptions of these specialties. Mr. Craig's address is 42 Cortlandt street, New York.

Thos. Drein & Son, Wilmington, Del., are hurrying orders for life boats that are to be furnished to vessels building at Chicago, Bay City, West Superior, Buffalo and Manitowoc, and also to several ship yards on the Atlantic coast.



### Some Peculiarities of Lake Shipping.

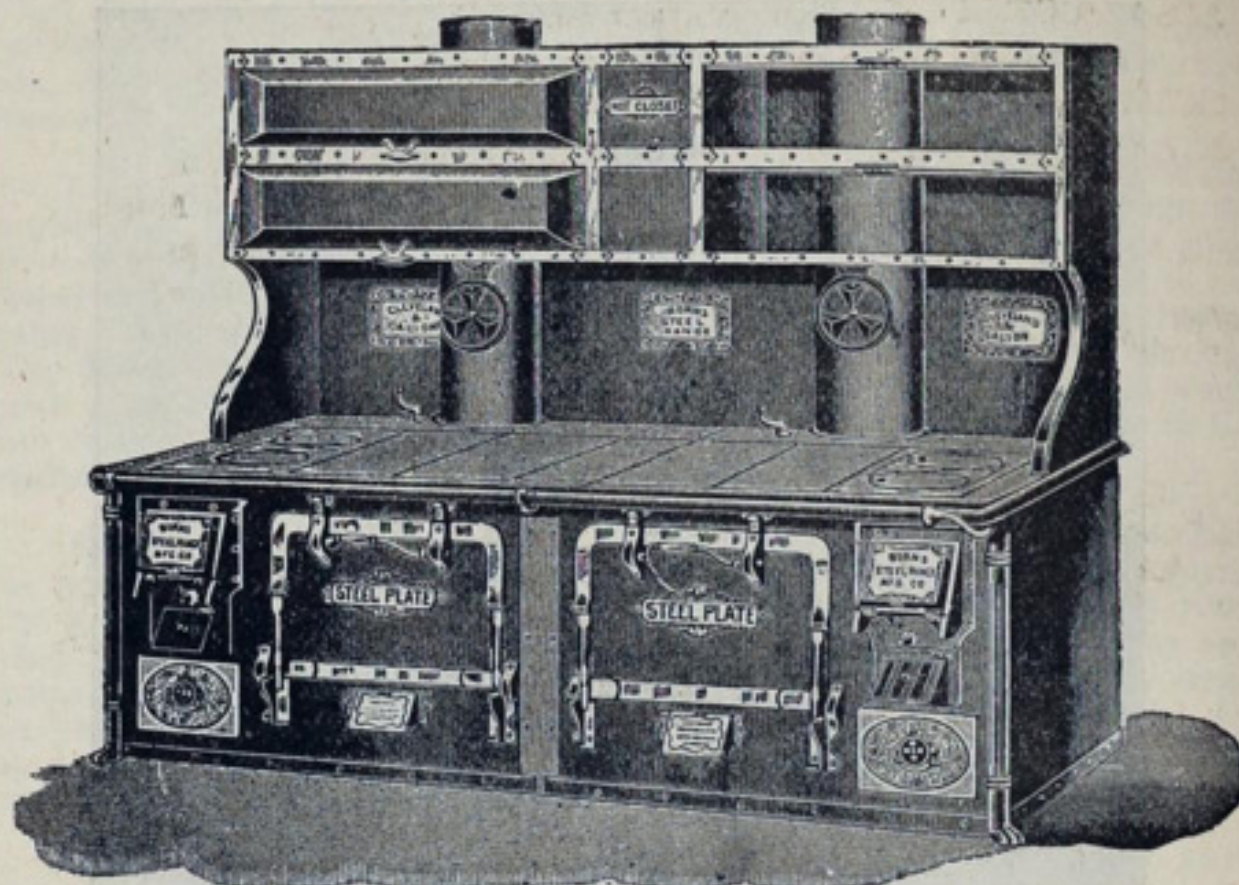
The February number of the Nautical Magazine (London) contains a short article on "Shipping of the Great Lakes," written by Wm. P. Anderson, general superintendent of Canadian light-houses. It is unfortunate that English publications are not favored with more contributions of the kind prepared by Mr. Anderson for this magazine. A few such articles would tend to correct the erroneous statements about lake shipping that are often noted in foreign journals. Although written after the style of popular magazine literature, Mr. Anderson's article shows that he is a very close student of everything pertaining to lake commerce. Short paragraphs in the article dealing with various phases of the subject show that he is better posted regarding lake shipping than most officers of our own light-house service, whose duties are constantly changing from the lakes to the seaboard and who are not permitted to remain long enough in lake districts to do more than acquaint themselves with matters under their immediate direction.

"The type of vessel originally used for freighting throughout this lake system," says Mr. Anderson in one paragraph, "was a three-masted schooner carrying fore-and-aft sails—rarely a foretop sail and topgallant sail—limited in draft to the depth in the old canals, 9 feet, but borrowing improved beating power by the use of a centerboard. Next, propellers were introduced, of a hideously ugly type, literally built to fit the canal locks, and having their draught limited first to 9 and after the enlargement of the Welland canal to 14 feet, and their length to 270 feet, or 200 feet for the River St. Lawrence canals. Keenness of competition soon taught the lesson that the larger vessel was the cheaper carrier; and from that conclusion an abandonment of the Welland canal route, and the selection of ports on Lake Erie which would permit the use of vessels larger than the docks would accommodate as eastern termini of the great lake freight traffic, was a logical step. Gradually the type has changed, the wants of shipping have forced the government to spend more and more on the improvement of connecting channels and harbors, and today it is literally true that with every inch of additional draft gained, so larger steamers and barges are built to take advantage of the improvement. Owners and agents are kept thoroughly posted on every little fluctuation in level, and load down to the last inch that can be wriggled over the shoalest spots to be navigated, while they are ever demanding still deeper channels that they may build still bigger boats."

Then Mr. Anderson writes of the most recently-built freight steamers which he describes as fine vessels, comparing with ocean freighters in size, but modified in many details to suit the peculiar conditions of lake traffic. "A point of special interest," he says, "is the difference in methods of navigating these large and valuable lake vessels from those practiced at sea. Lake captains, as a class, are pilots rather than navigators; their routes are landlocked, courses are comparatively short, and landmarks are frequent. Aids to navigation are liberally supplied by both Canadian and American governments, and thick weather is fortunately infrequent, compared with that encountered at sea. Consequently masters depend on time runs for picking up landmarks, and I have never heard of a lake captain taking a sextant observation for position. It is a question if a dozen of them have sextants on their ships. Lead lines, too, are very seldom used, though all the American waters have been admirably surveyed and charted, but vessels are pushed along at full speed, and sight is the main guide depended upon for safety. It is wonderful how well vessels are managed in this way, how small the percentage of accidents is, and how skillful in manœuvring constant practice

makes the officers. To see two big freighters passing each other in a rock cut, less wide than the length of either of them, with an indraught of water displaced by their bulk that bares the shoals on each side of the cut, or to see one of them going to her berth in the Sault canal or in a crowded harbor without any loss of time or assistance from tugs or capstans, is a liberal education in the possibilities of handling heavy vessels."

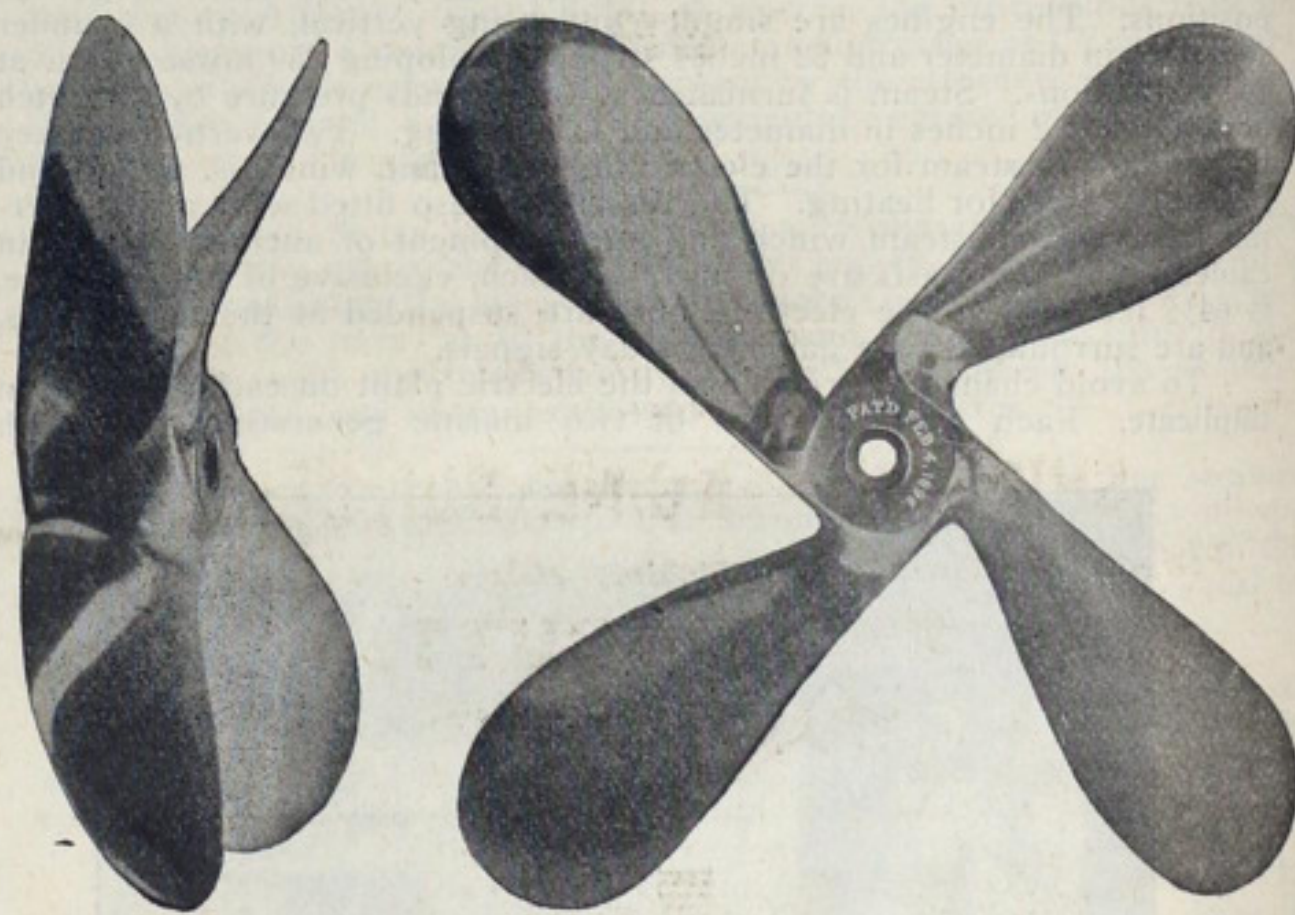
### Marine Ranges.



Above is an illustration of ranges that are being made by the Born Steel Range & Mfg. Co., Cleveland, for the two revenue cutters building by the Globe Iron Works Co. The Born company is finding sale for these ranges in all parts of the United States, and they are also building up a foreign trade of considerable importance. They recently furnished four ranges to the Hilles & Jones Co., ship and car builders, Wilmington, Del., and they have also made large shipments to Johannesburg, South Africa, and to South America.

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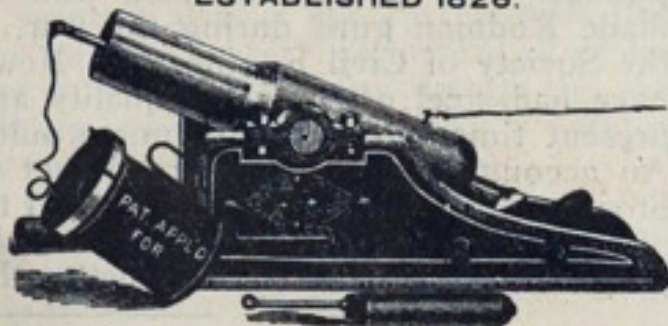
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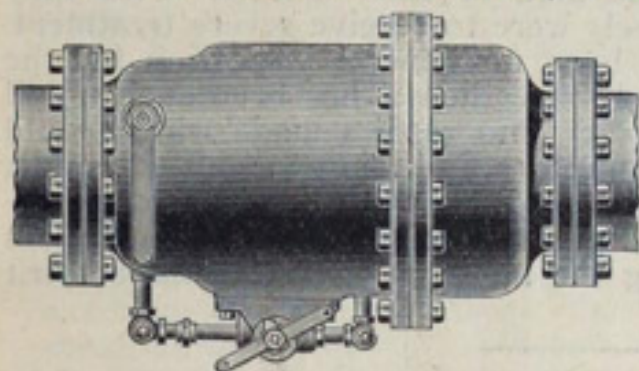
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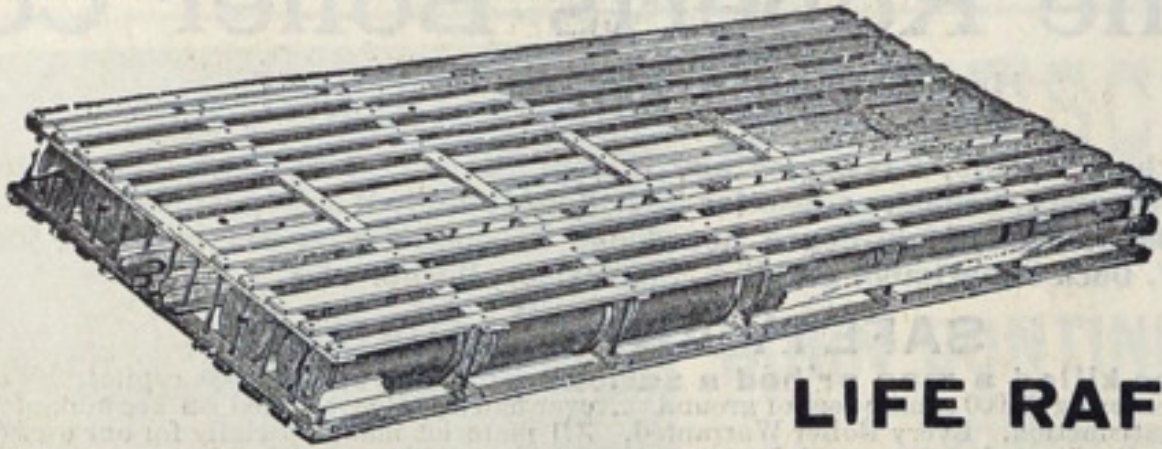
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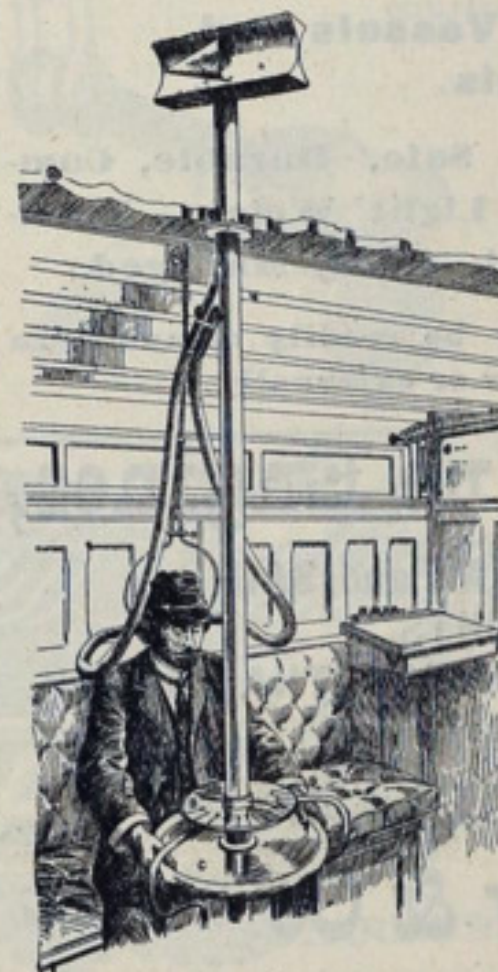
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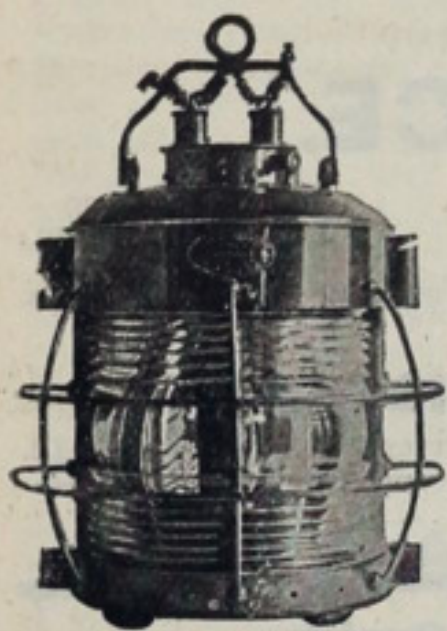
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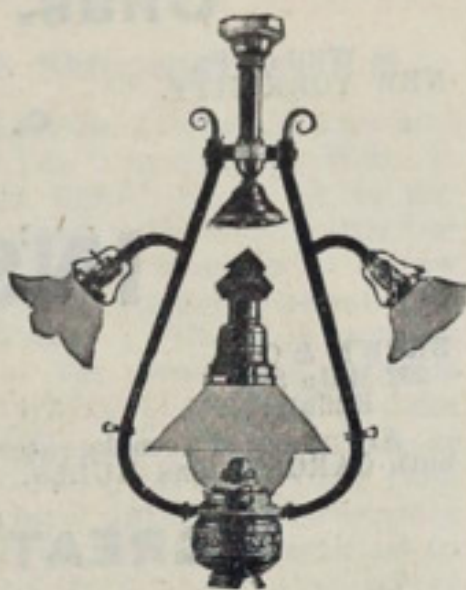
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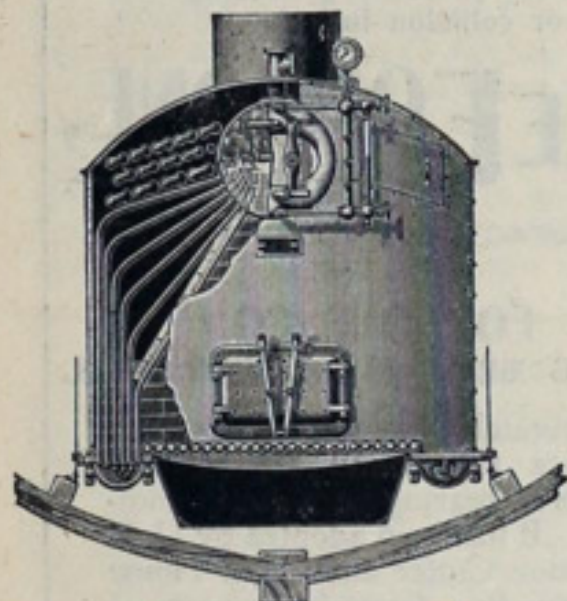
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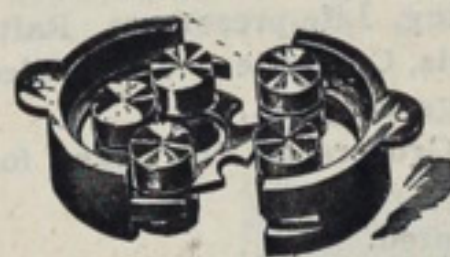
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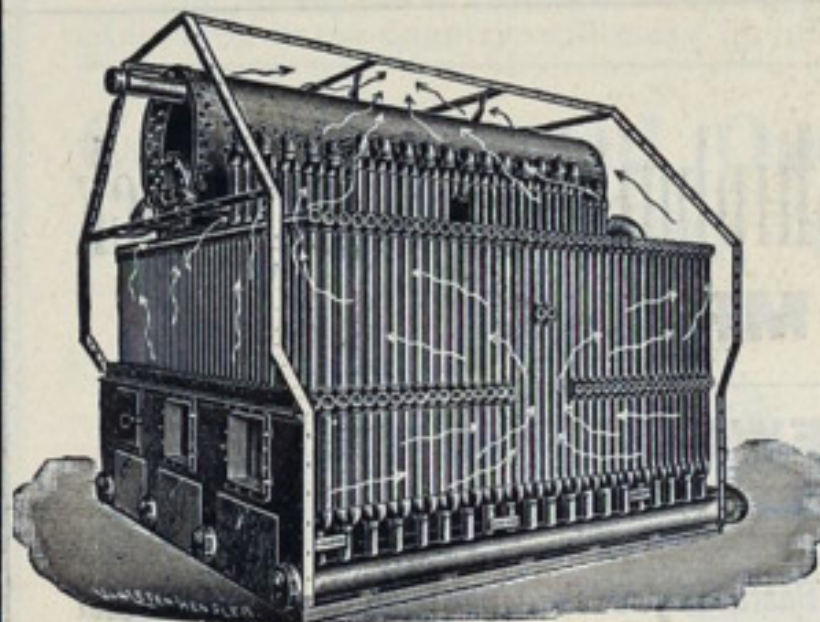
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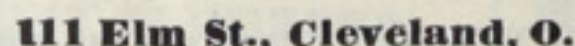
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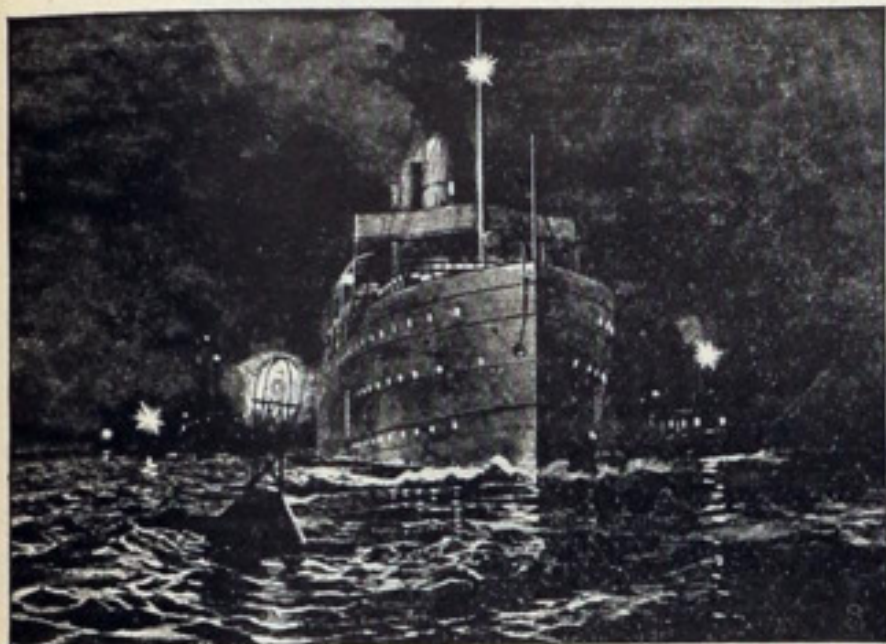
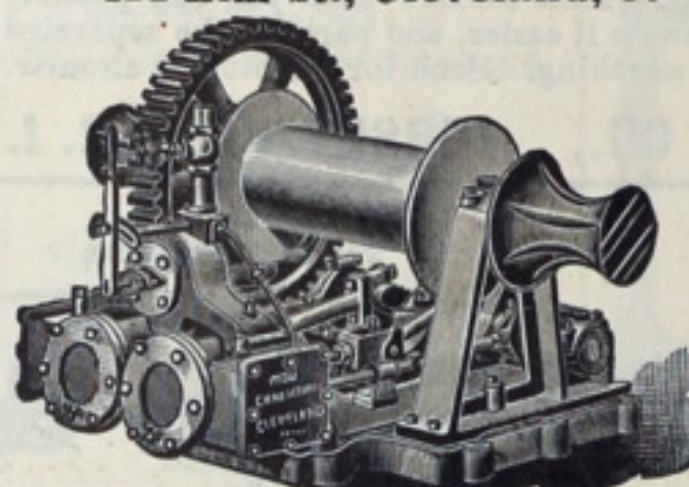
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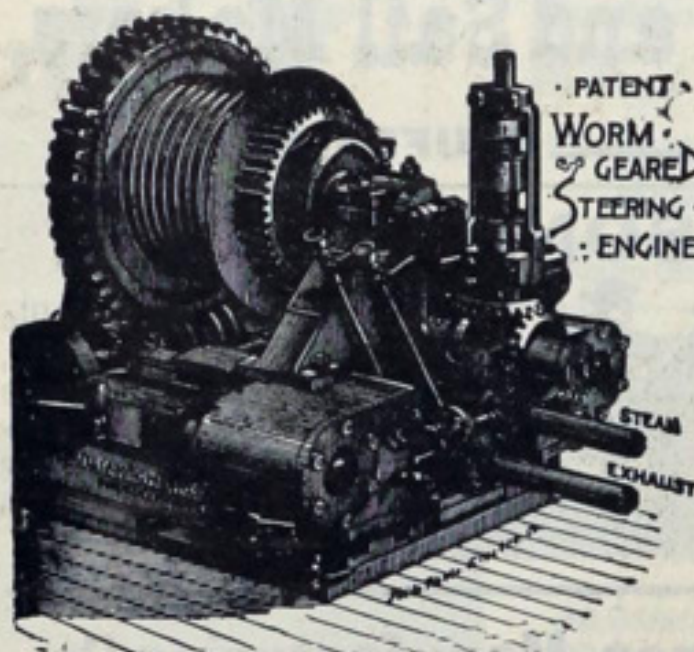


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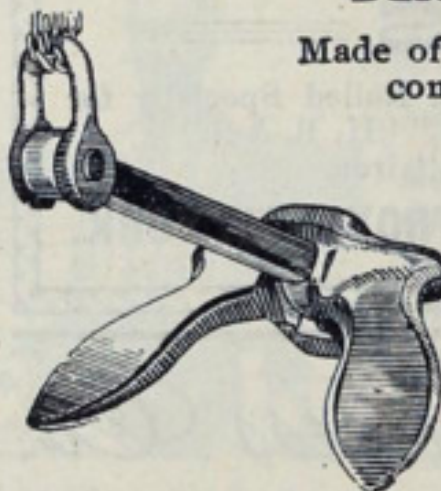


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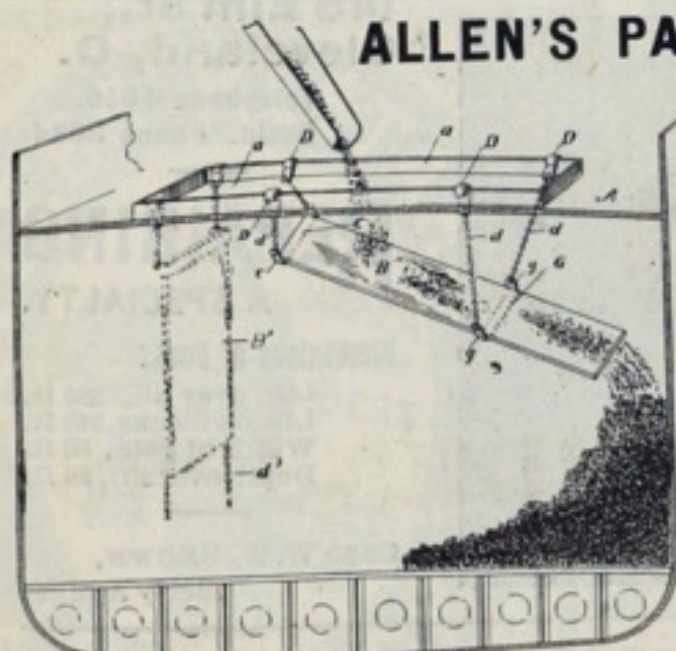


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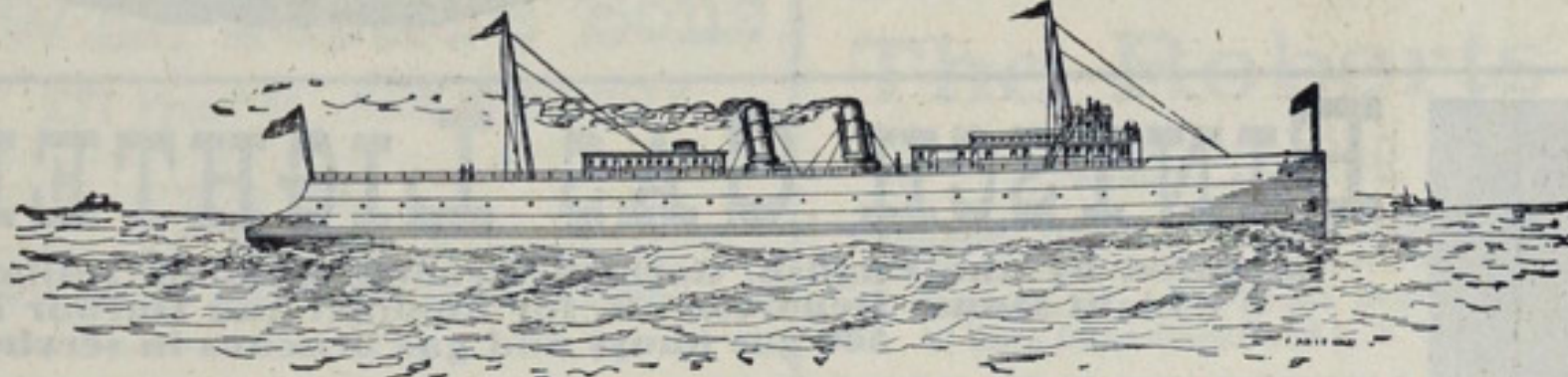
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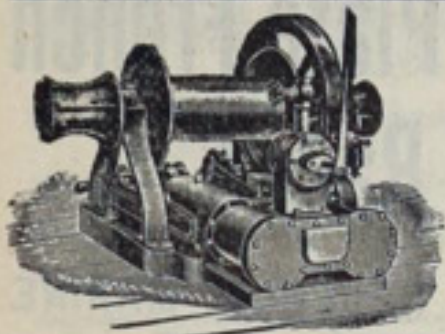
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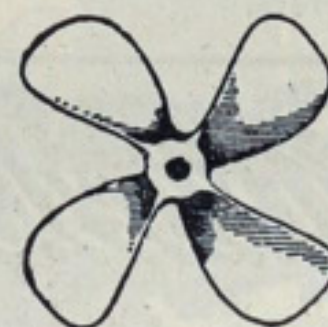
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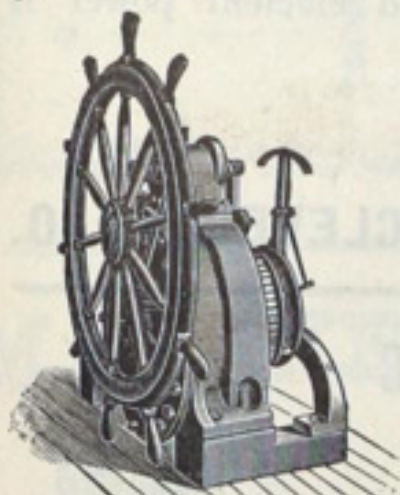
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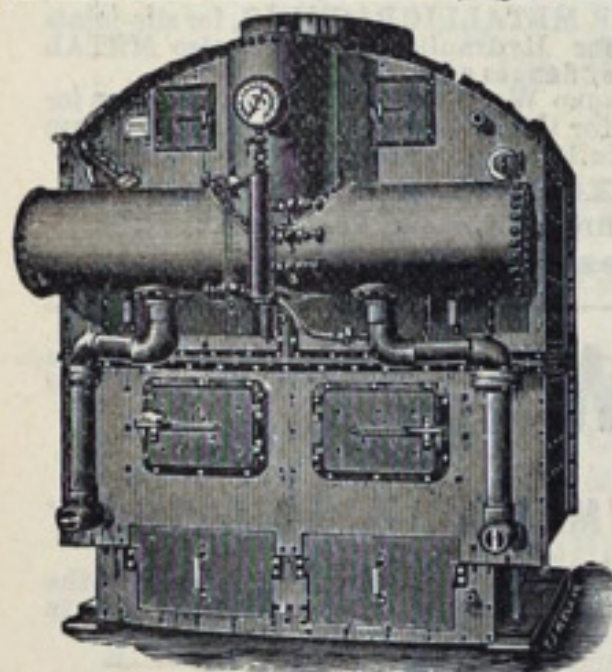
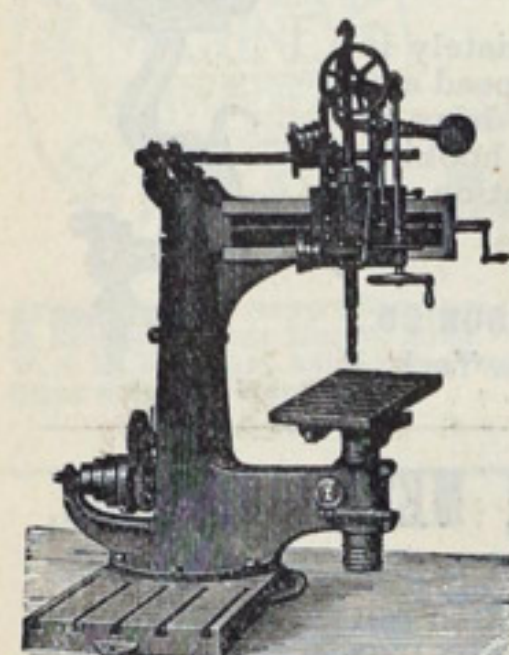
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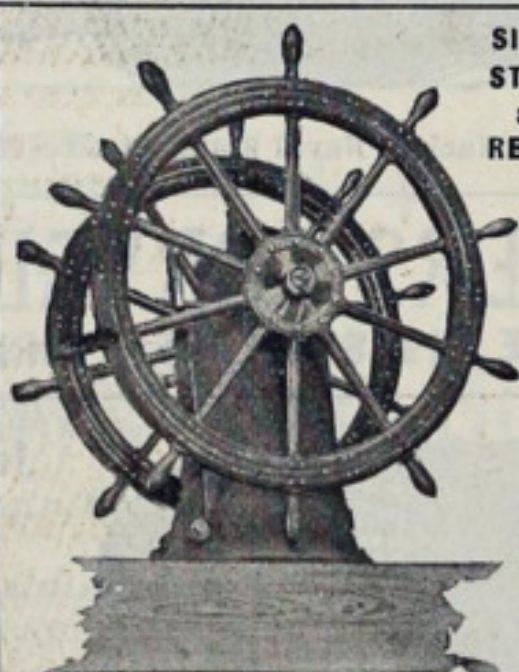
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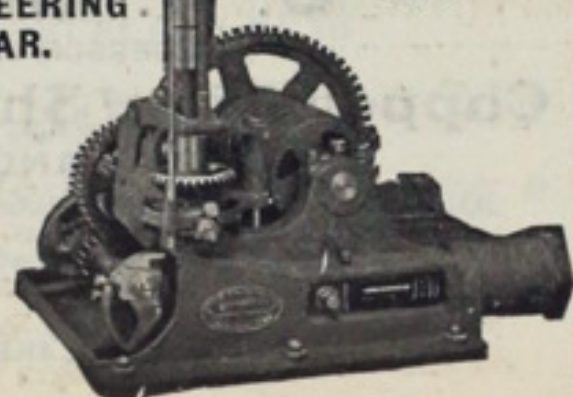


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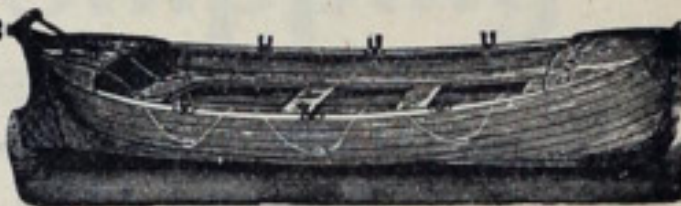
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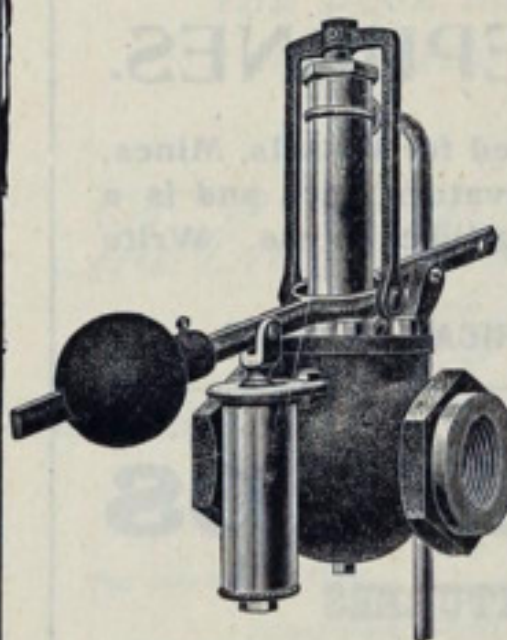
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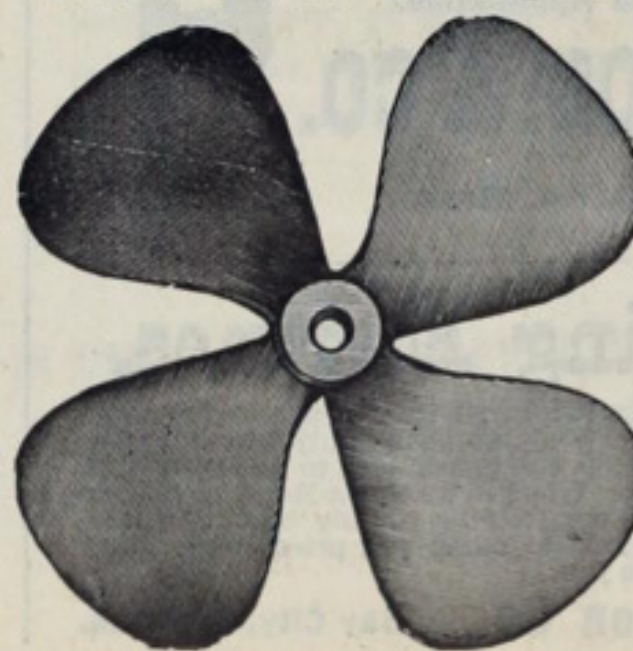
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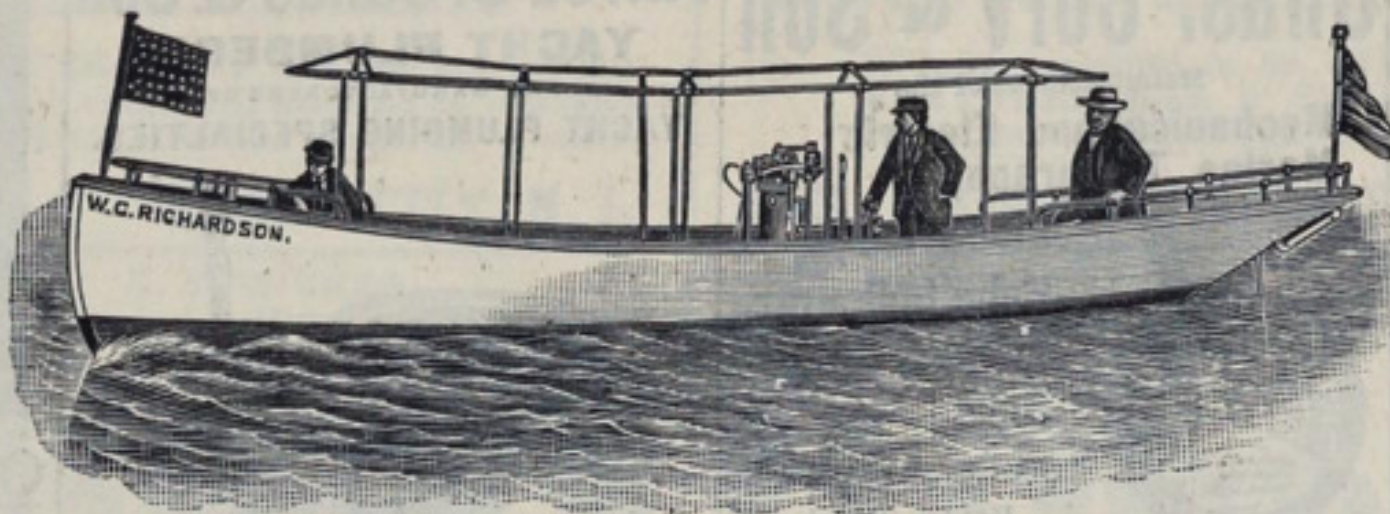


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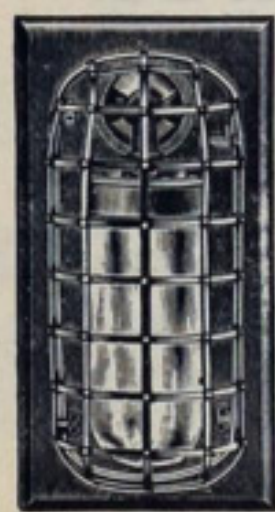
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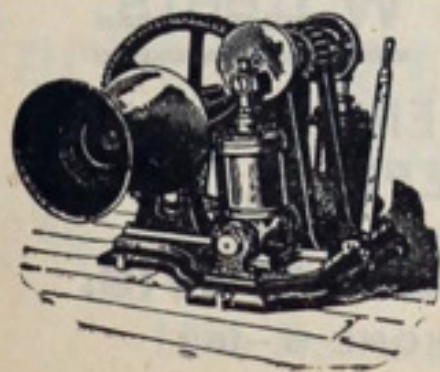
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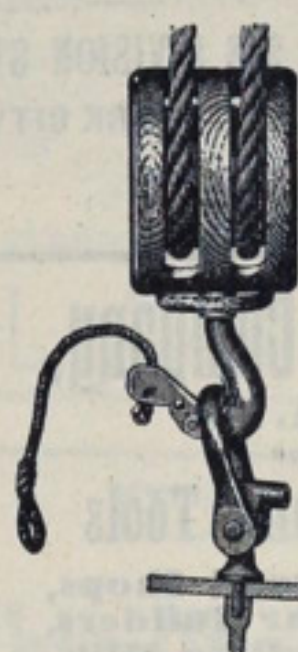
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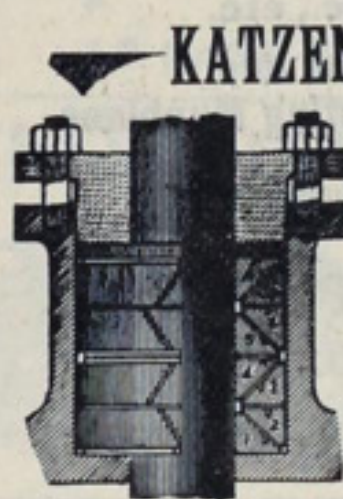


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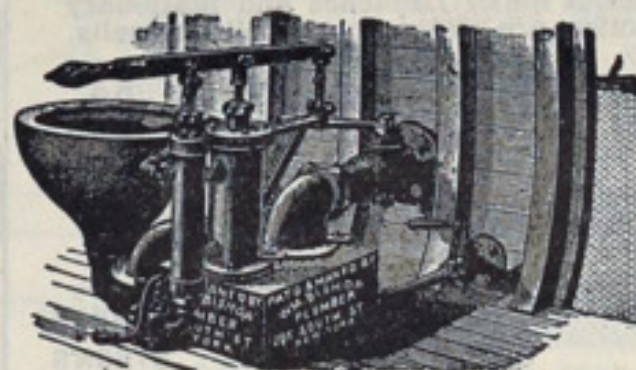
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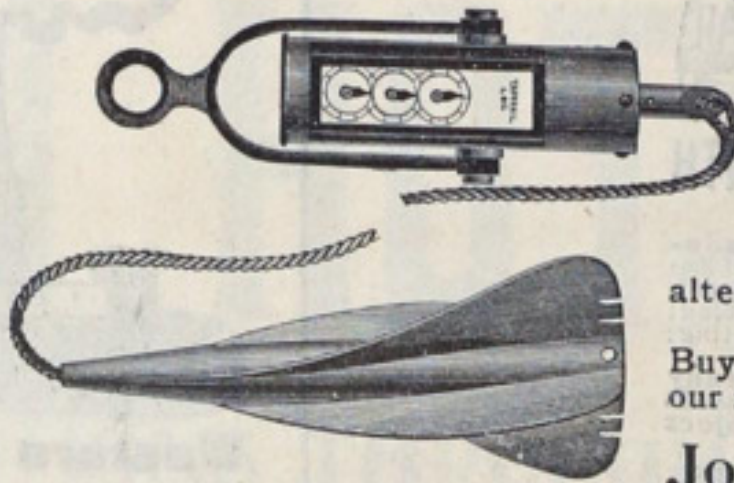
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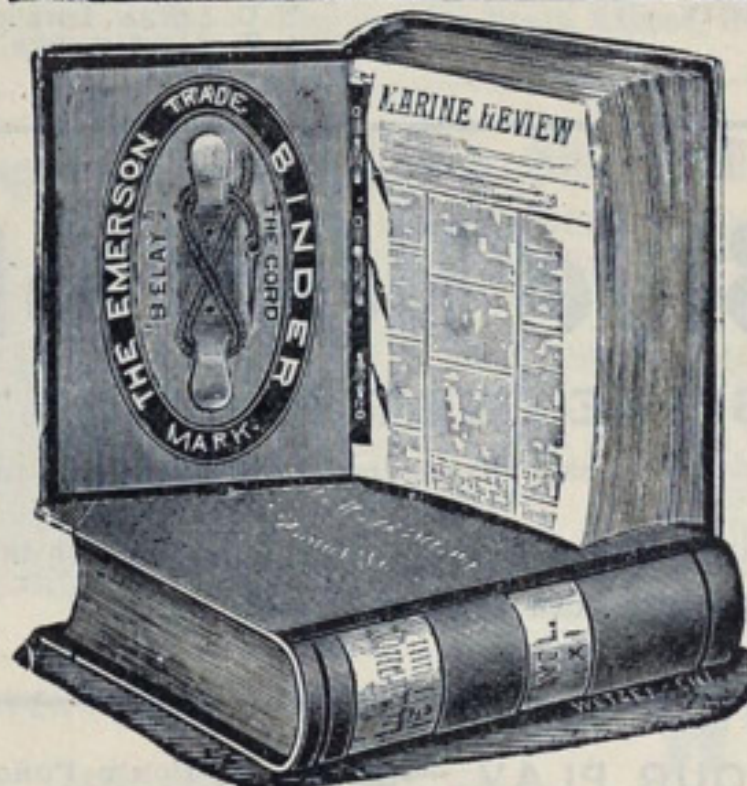
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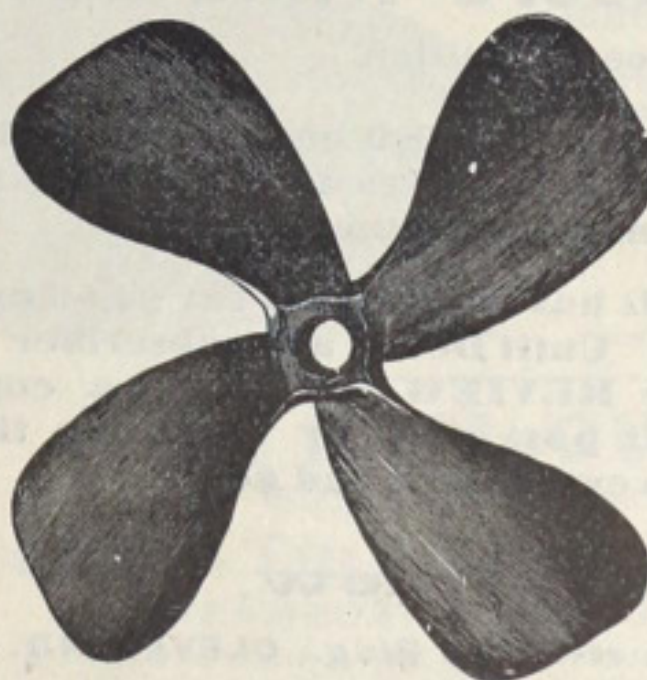
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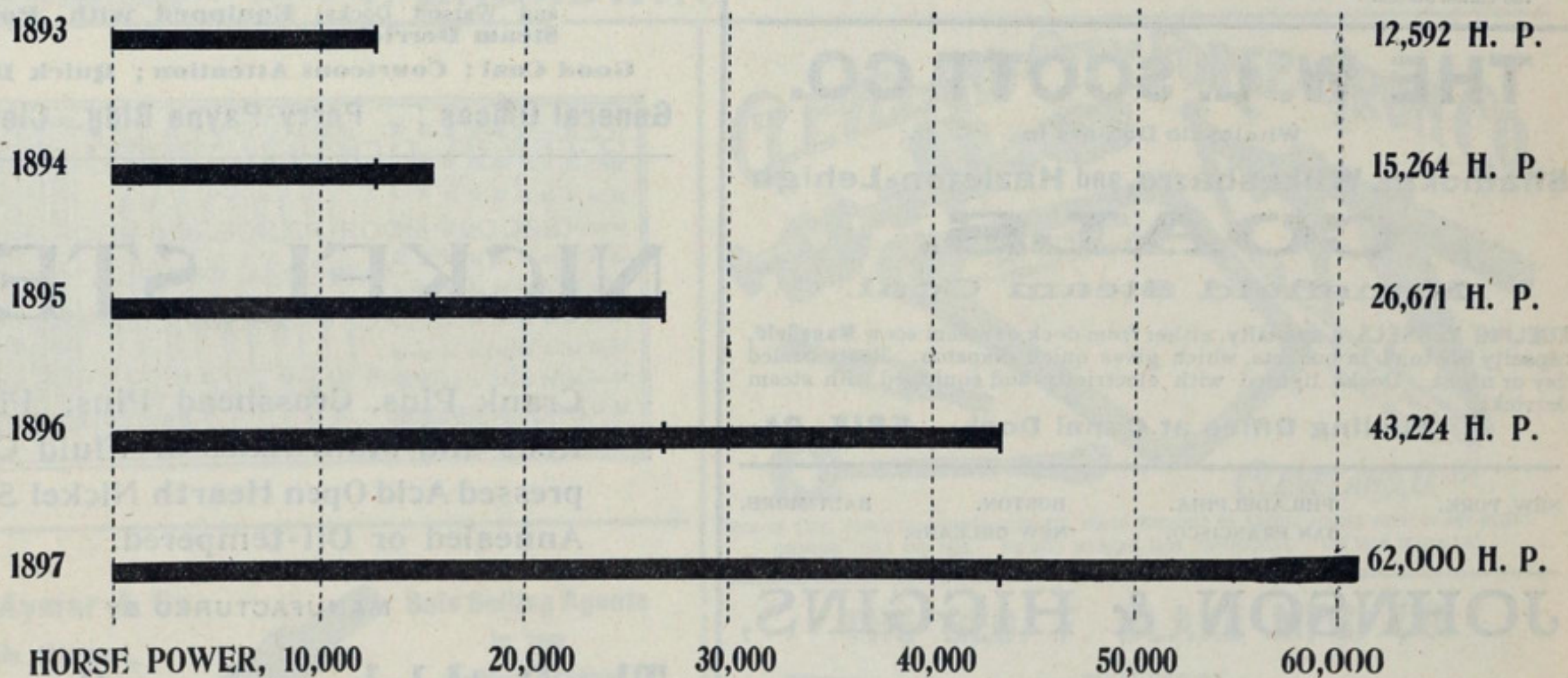
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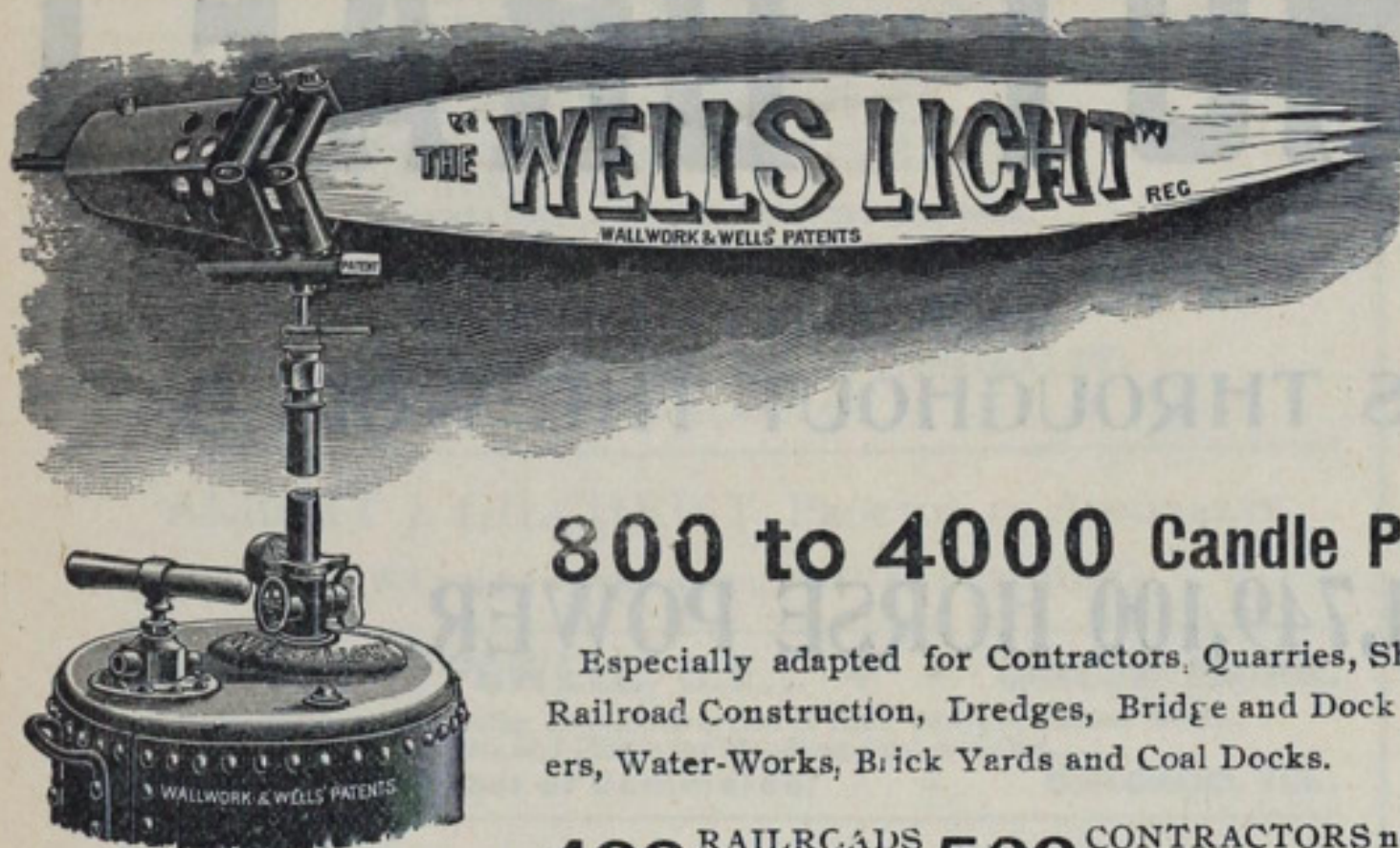
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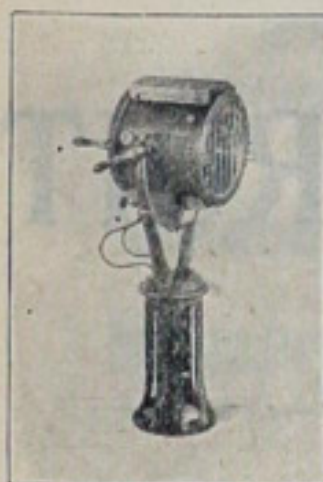
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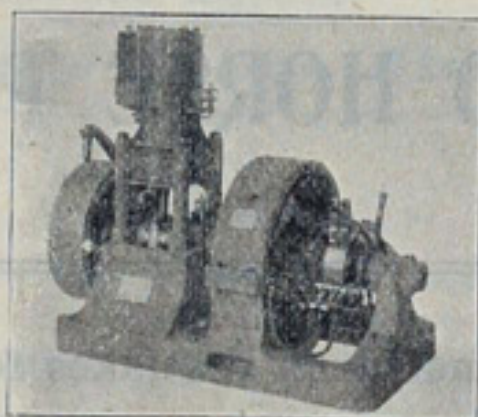
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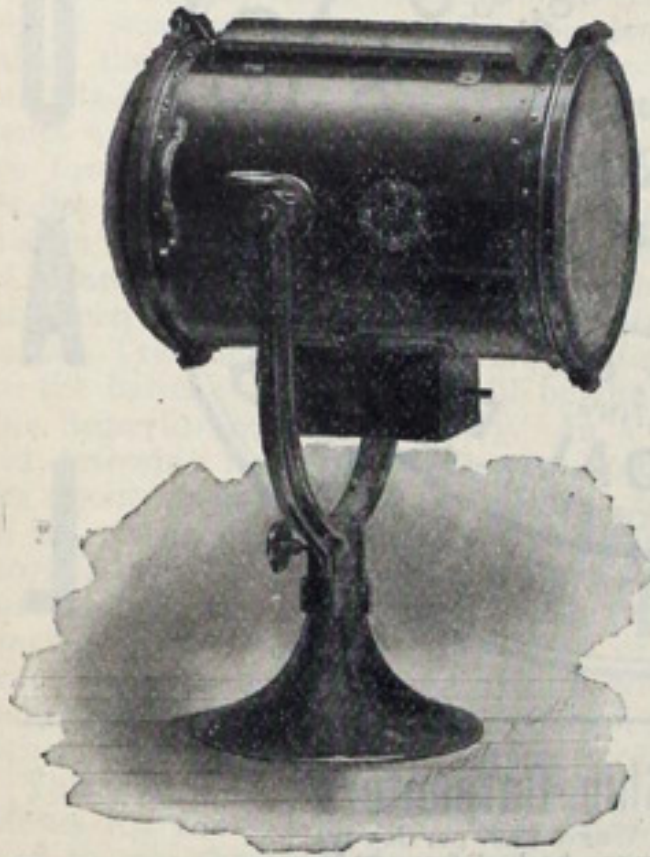
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The fastest of the six composite Gunboats recently constructed for the U. S. N. (**MARIETTA** and **ANNAPOLIS**) are equipped with these boilers.  
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**Over 100  
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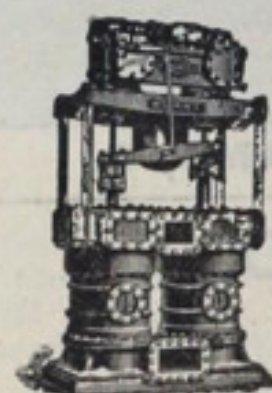
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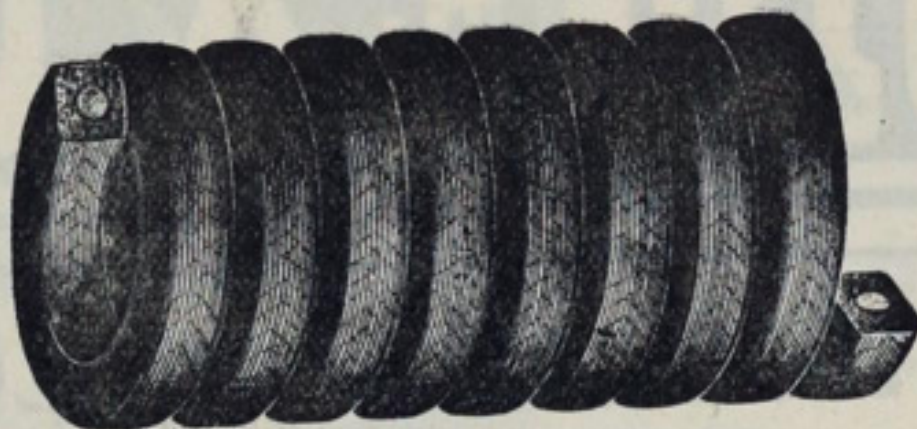


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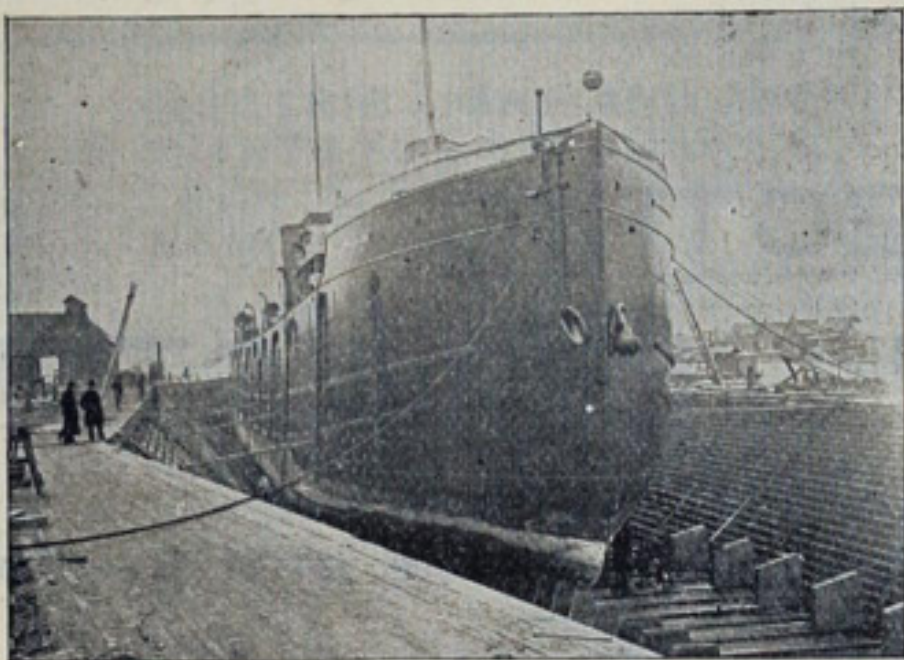
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Length, extreme.....537 feet.	Entrance, Top.....55 feet 9 in
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Breadth, Bottom.....52 "	Depth over Sills.....18 "

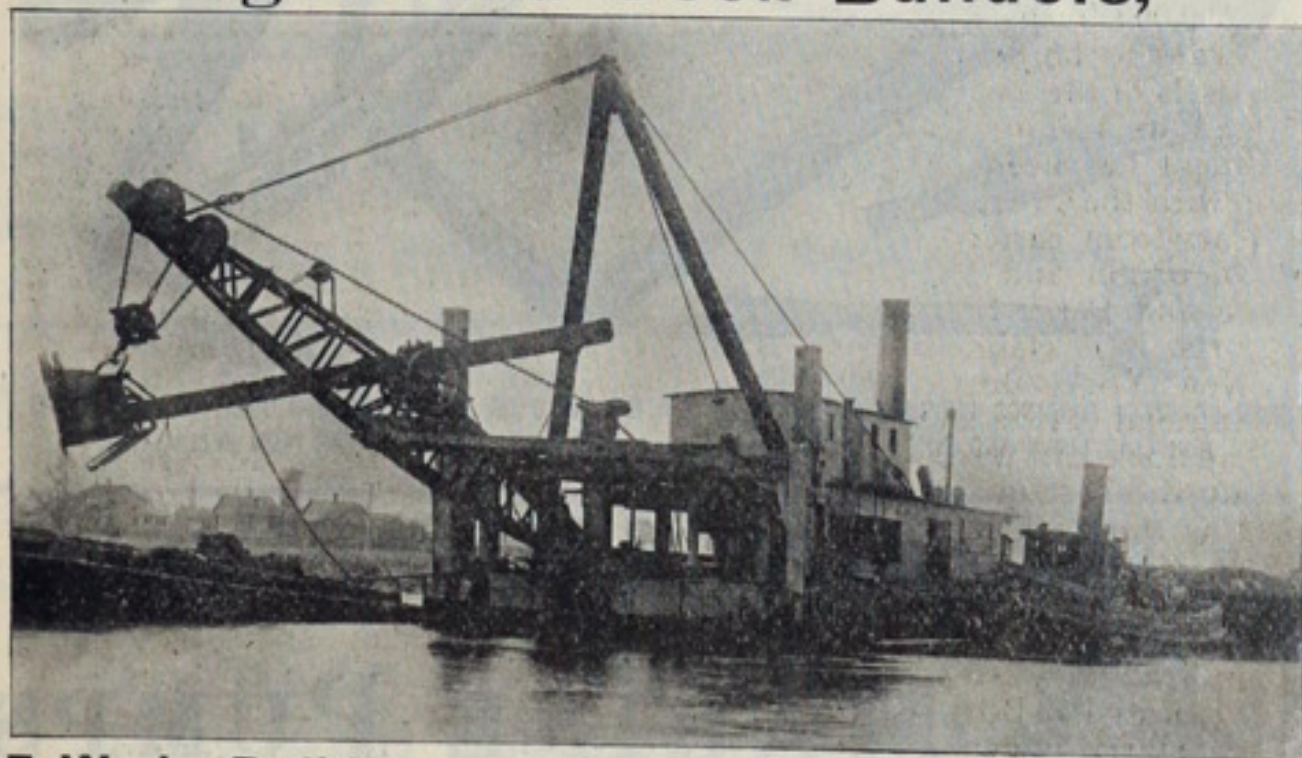
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Have bought this space to tell lake engine builders and engineers about their economical trap.

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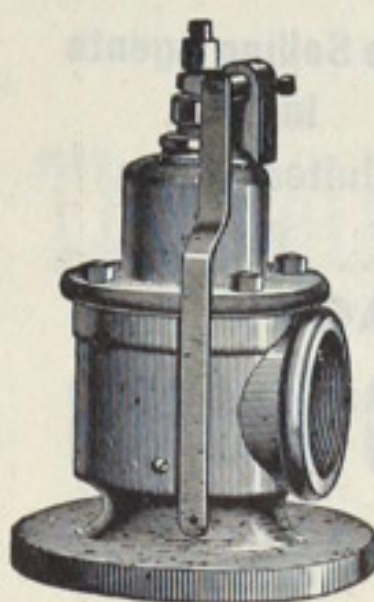
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INGOTS, CASTINGS, WIRE RODS, SHEETS, ETC.  
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CROSBY STEAM ENGINE INDICATORS, with Sargent's Electrical Attachment for taking any number of Diagrams simultaneously.

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